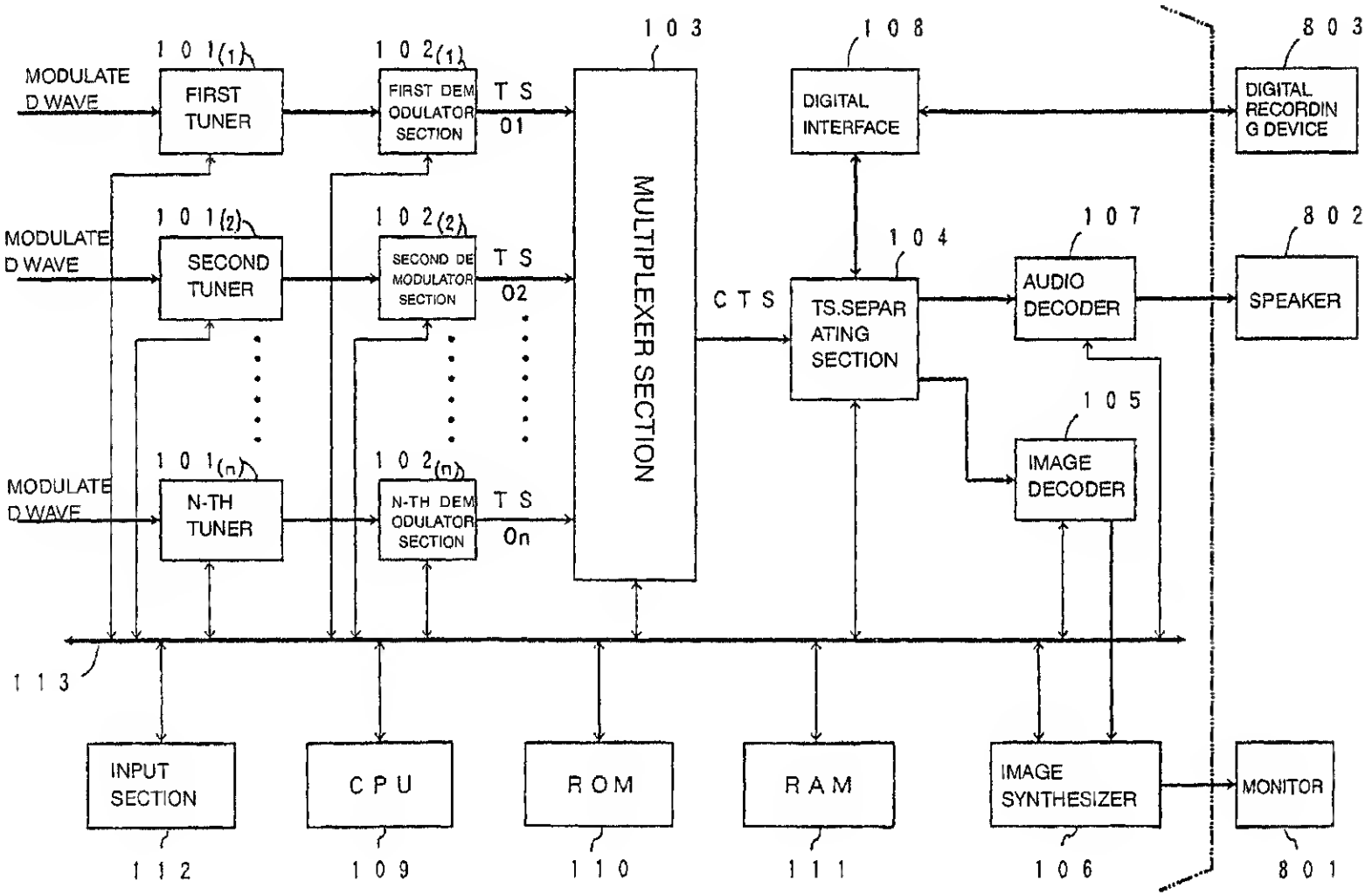
PCT/EP2003/008260

FIG. 1



PUBLISHED BEFORE

FIG. 2

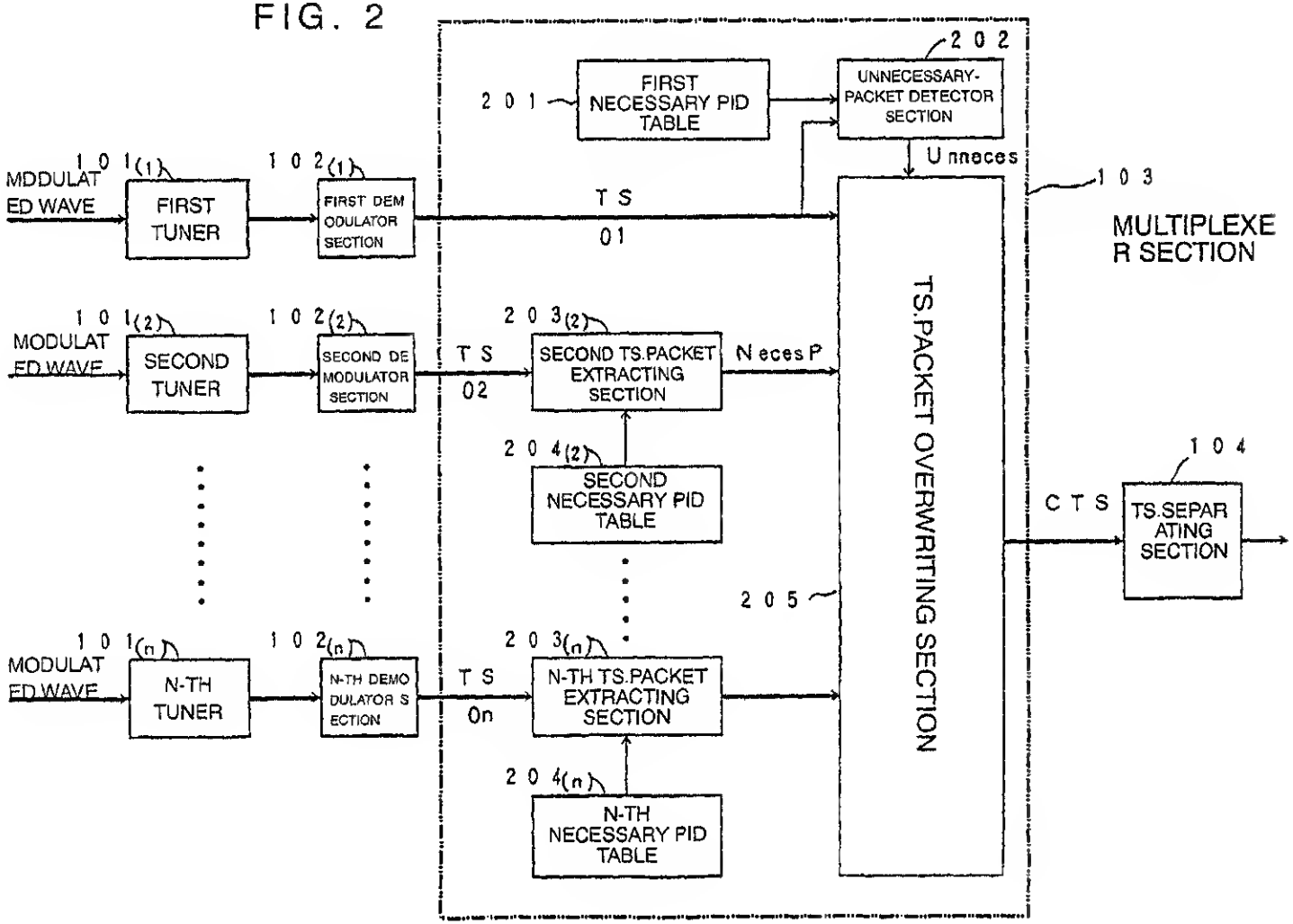
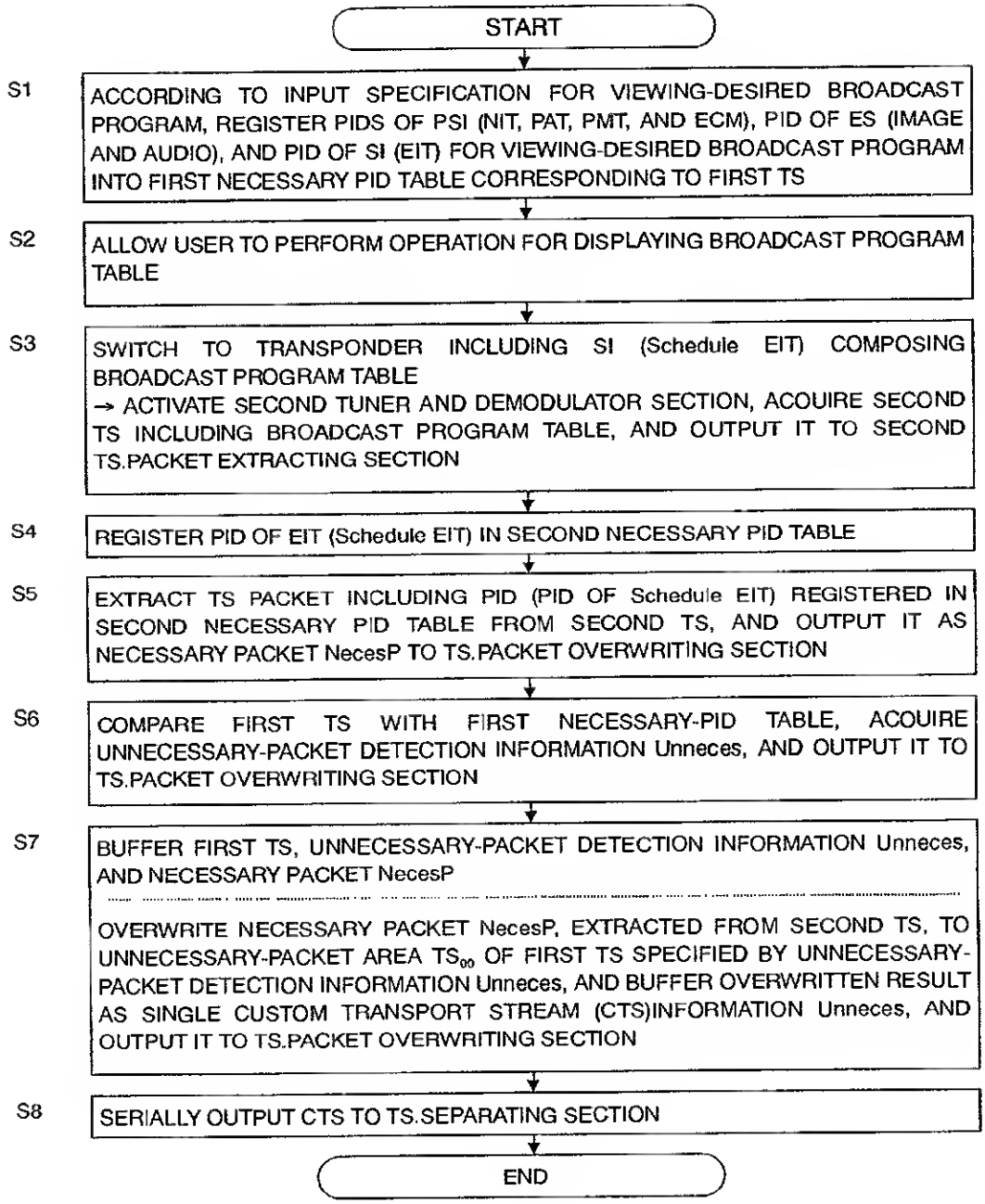


FIG. 3

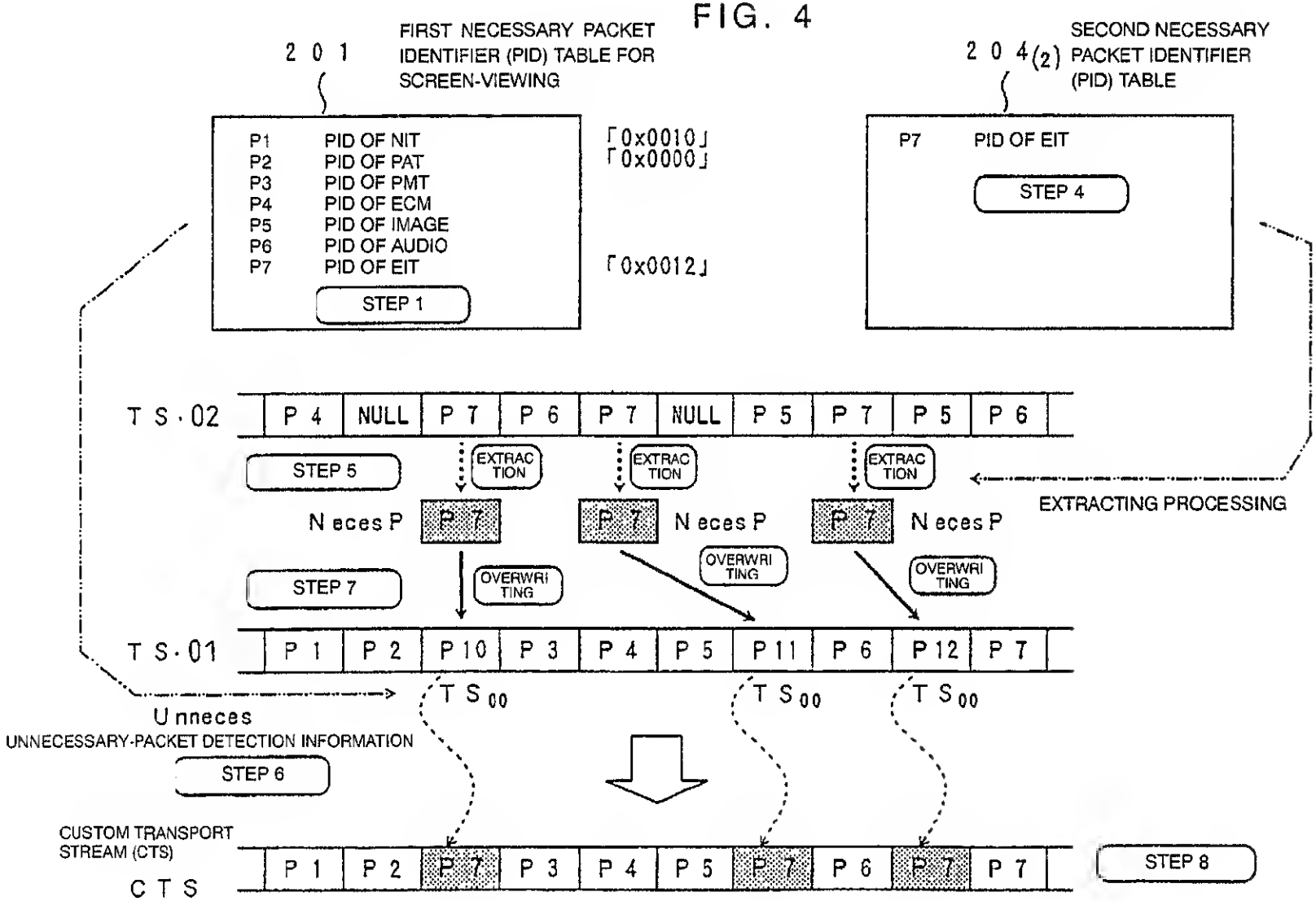


PSI : PROGRAM SPECIFIC INFORMATION
NIT : NETWORK INFORMATION TABLE
PAT : PROGRAM ASSOCIATION TABLE
PMT : PROGRAM MAP TABLE
ECM : ENTITLEMENT CONTROL MESSAGE

ES : ELEMENTARY STREAM (IMAGE SIGNAL, AUDIO SIGNAL, DATA SIGNAL)
SI : BROADCAST-PROGRAM LAYOUT INFORMATION
TSP : TRANSPORT STREAM PACKET
PID : PACKET IDENTIFIER
EIT : EVENT INFORMATION TABLE

PCT/JP2004/012200

FIG. 4



PCT/JP2004/000000

FIG. 5

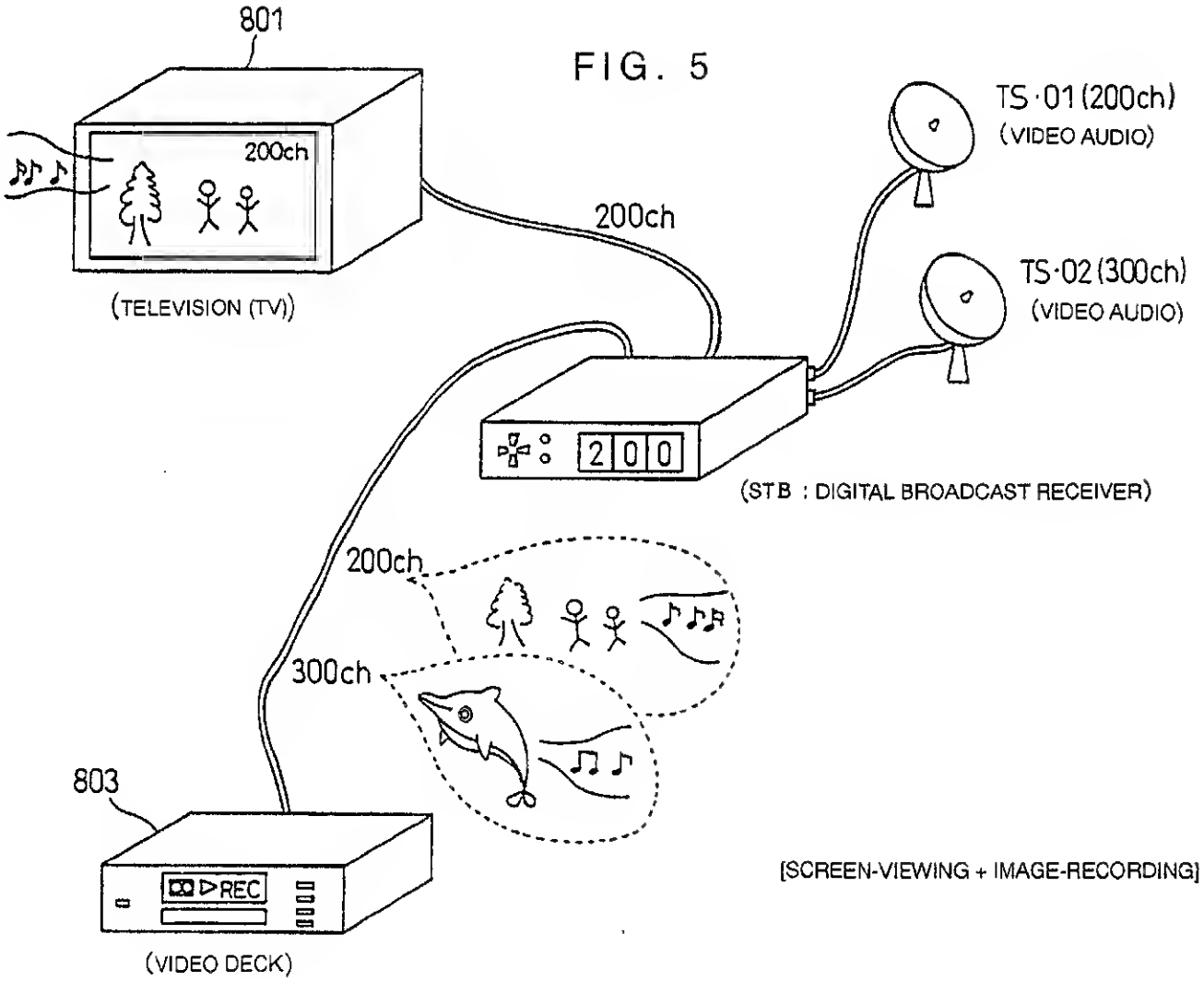
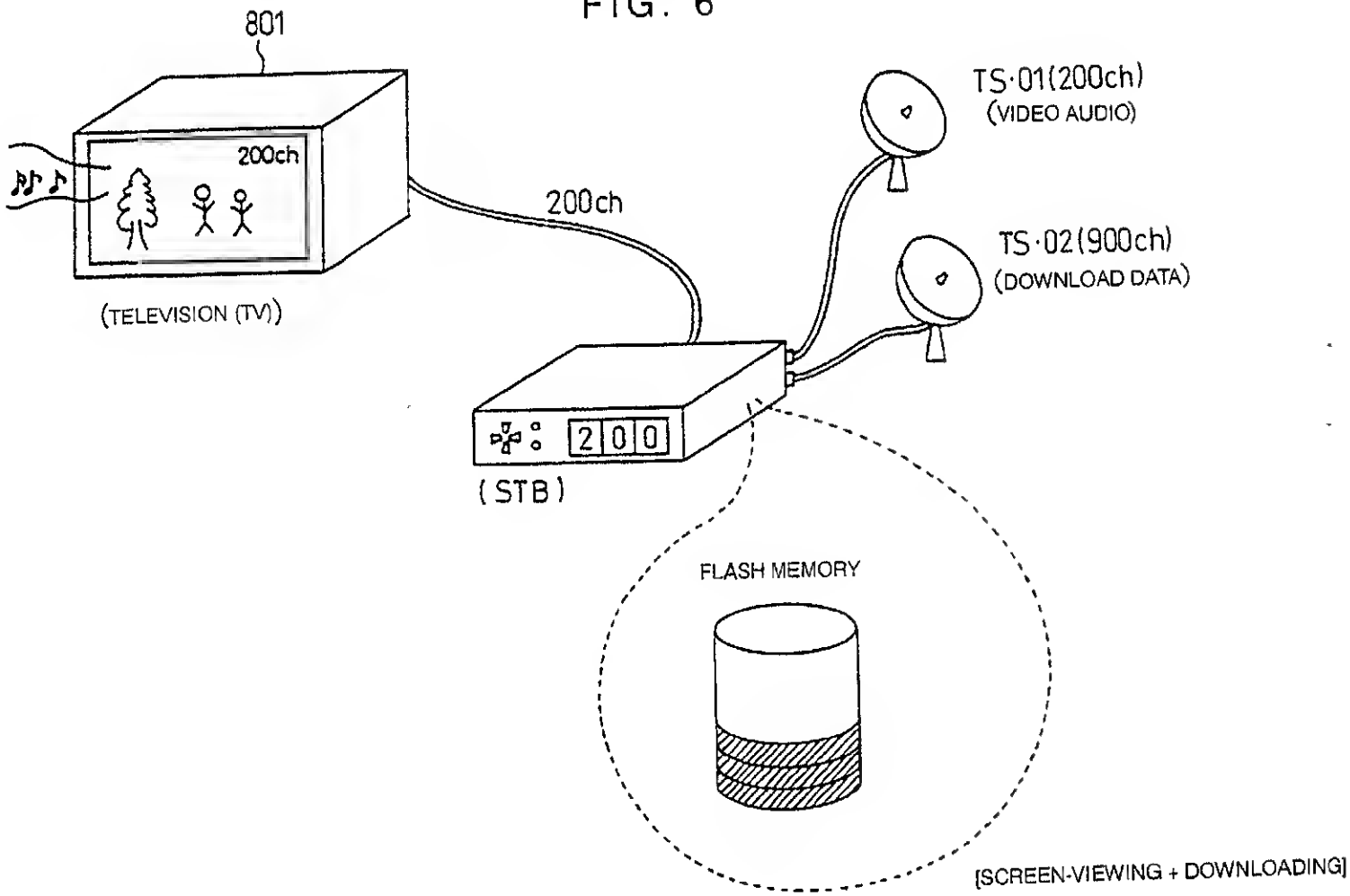
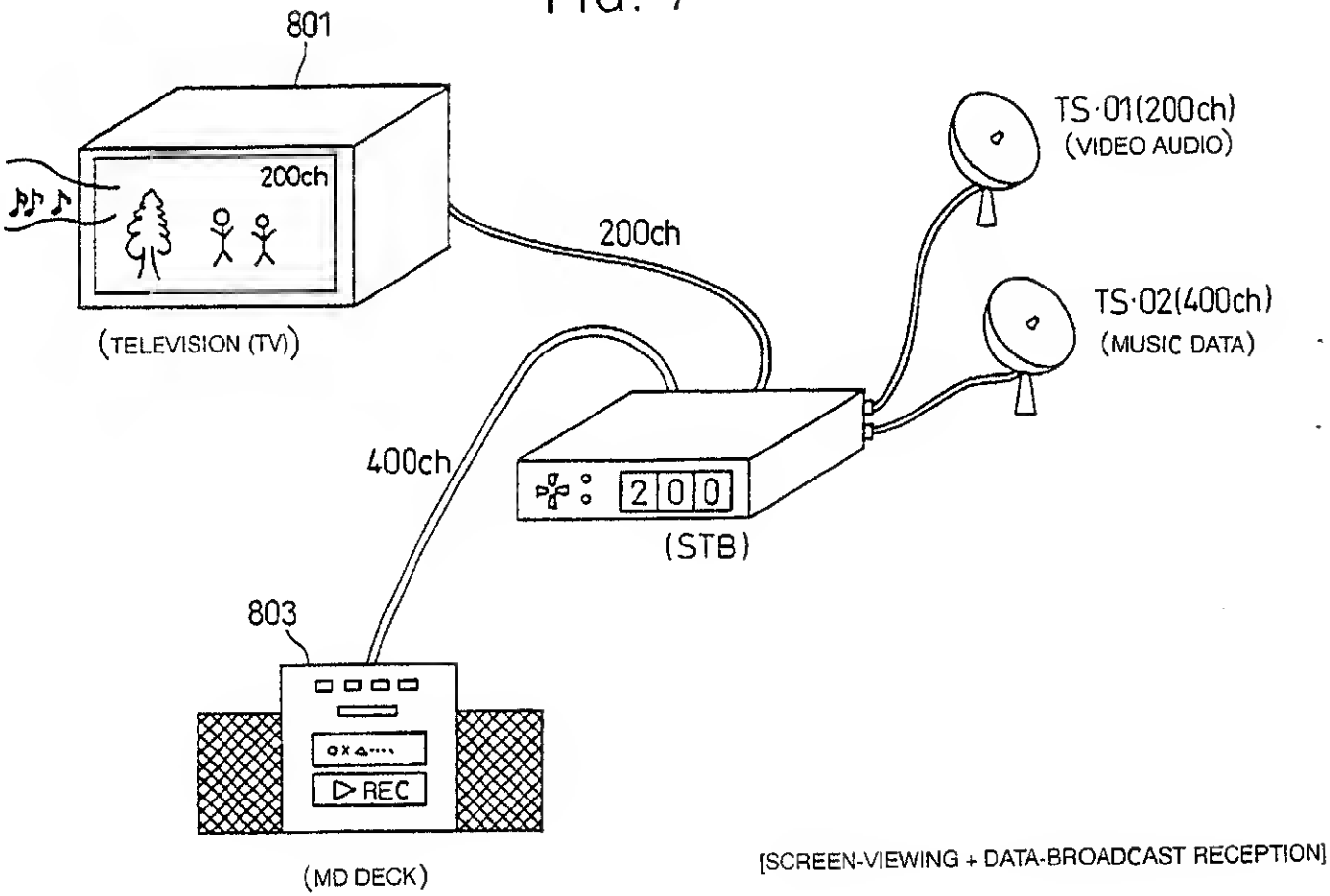


FIG. 6


801
200ch
(TELEVISION (TV))
200ch
TS·01(200ch)
(VIDEO AUDIO)
TS·02(900ch)
(DOWNLOAD DATA)
2 0 0
(STB)
FLASH MEMORY
[SCREEN-VIEWING + DOWNLOADING]

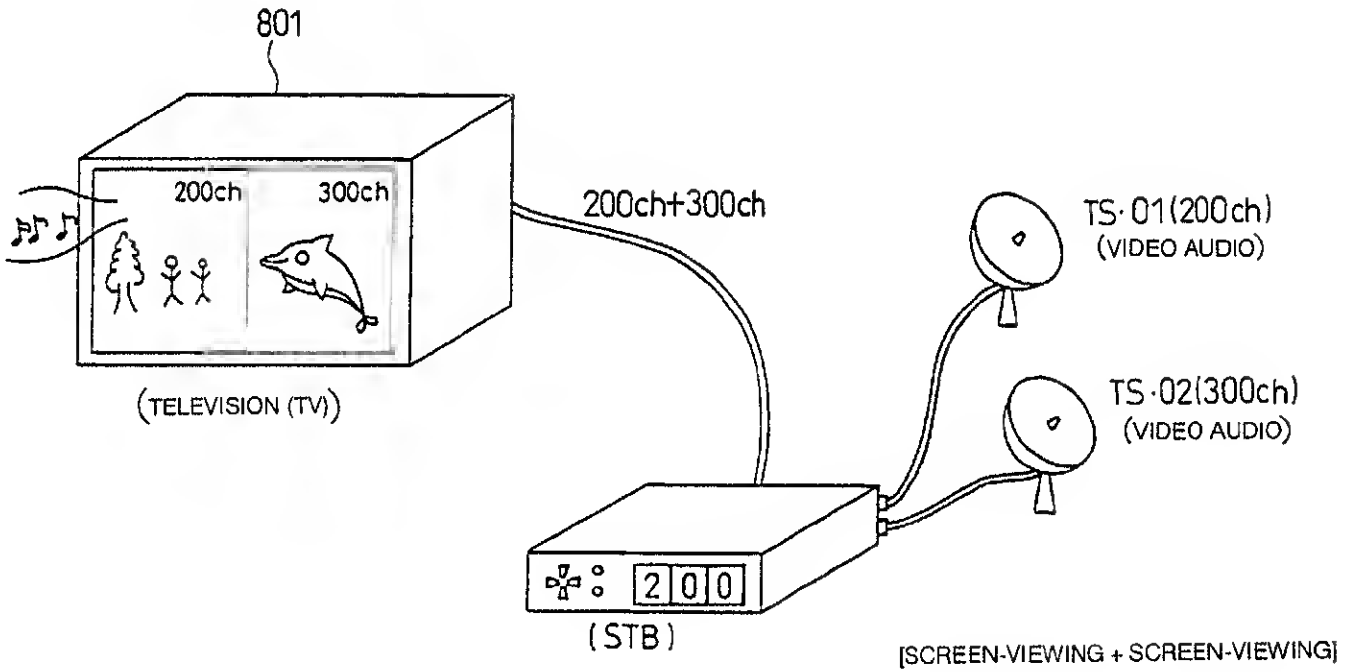
POSTED 02/18/00

FIG. 7



[SCREEN-VIEWING + DATA-BROADCAST RECEPTION]

FIG. 8


801
200ch
300ch
(TELEVISION (TV))
200ch+300ch
TS·01(200ch)
(VIDEO AUDIO)
TS·02(300ch)
(VIDEO AUDIO)
2 0 0
(STB)
[SCREEN-VIEWING + SCREEN-VIEWING]

PCT/JP2004/019250

FIG. 9

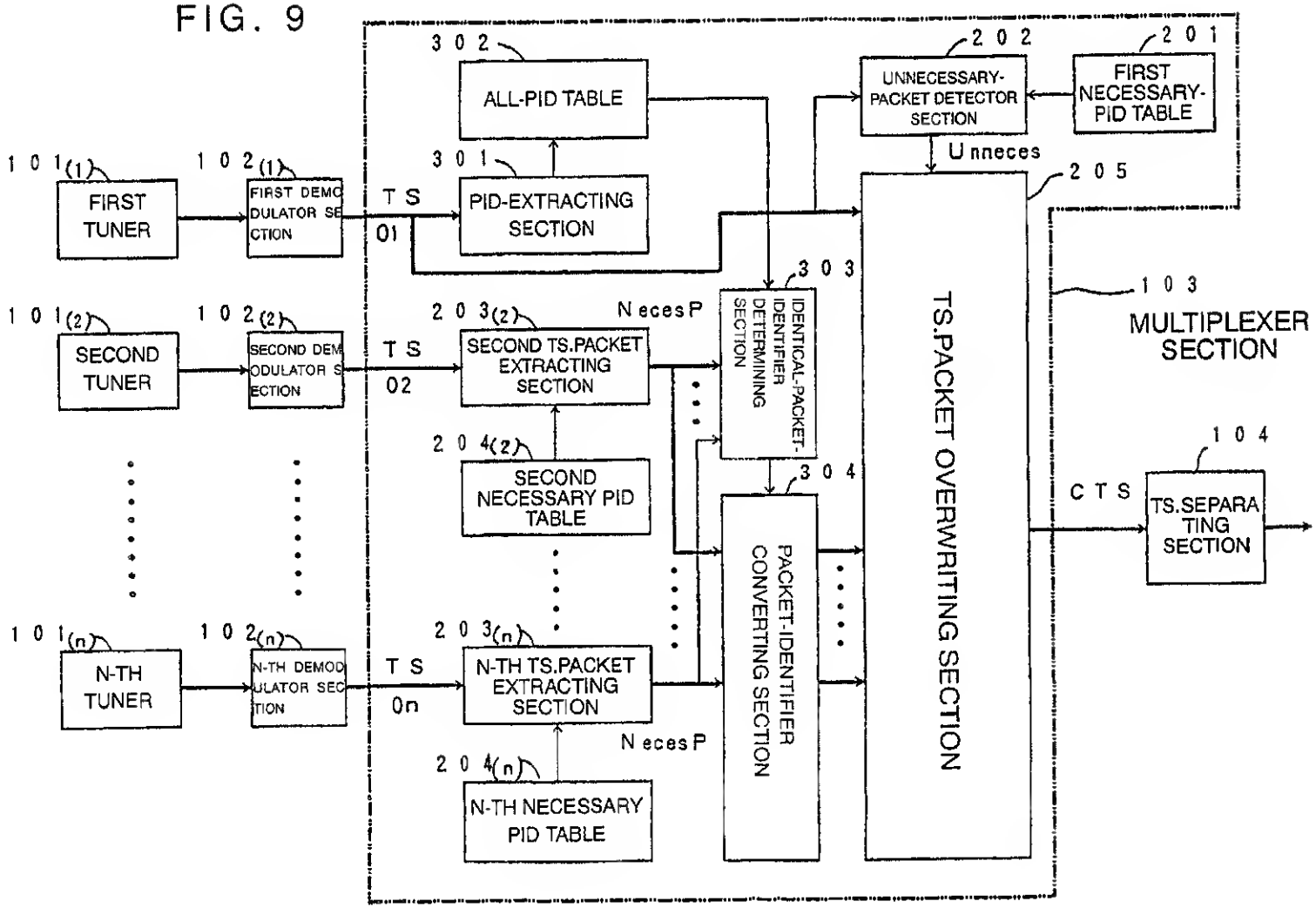


FIG. 10

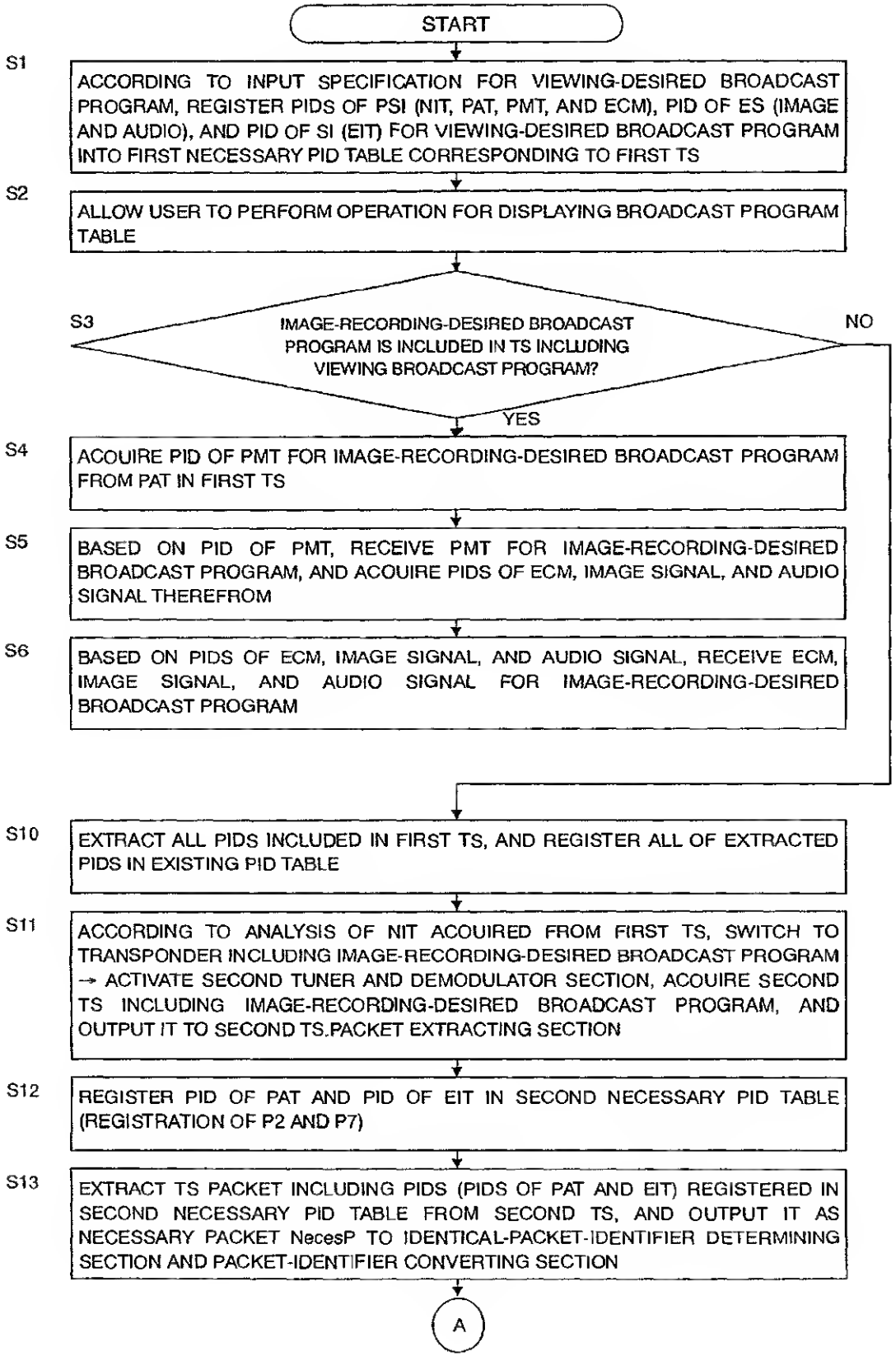

START
S1
ACCORDING TO INPUT SPECIFICATION FOR VIEWING-DESIRED BROADCAST PROGRAM, REGISTER PIDS OF PSI (NIT, PAT, PMT, AND ECM), PID OF ES (IMAGE AND AUDIO), AND PID OF SI (EIT) FOR VIEWING-DESIRED BROADCAST PROGRAM INTO FIRST NECESSARY PID TABLE CORRESPONDING TO FIRST TS
S2
ALLOW USER TO PERFORM OPERATION FOR DISPLAYING BROADCAST PROGRAM TABLE
S3
IMAGE-RECORDING-DESIRED BROADCAST PROGRAM IS INCLUDED IN TS INCLUDING VIEWING BROADCAST PROGRAM?
NO
YES
S4
ACOUIRE PID OF PMT FOR IMAGE-RECORDING-DESIRED BROADCAST PROGRAM FROM PAT IN FIRST TS
S5
BASED ON PID OF PMT, RECEIVE PMT FOR IMAGE-RECORDING-DESIRED BROADCAST PROGRAM, AND ACOUIRE PIDS OF ECM, IMAGE SIGNAL, AND AUDIO SIGNAL THEREFROM
S6
BASED ON PIDS OF ECM, IMAGE SIGNAL, AND AUDIO SIGNAL, RECEIVE ECM, IMAGE SIGNAL, AND AUDIO SIGNAL FOR IMAGE-RECORDING-DESIRED BROADCAST PROGRAM
S10
EXTRACT ALL PIDS INCLUDED IN FIRST TS, AND REGISTER ALL OF EXTRACTED PIDS IN EXISTING PID TABLE
S11
ACCORDING TO ANALYSIS OF NIT ACOUIRED FROM FIRST TS, SWITCH TO TRANSPONDER INCLUDING IMAGE-RECORDING-DESIRED BROADCAST PROGRAM → ACTIVATE SECOND TUNER AND DEMODULATOR SECTION, ACOUIRE SECOND TS INCLUDING IMAGE-RECORDING-DESIRED BROADCAST PROGRAM, AND OUTPUT IT TO SECOND TS.PACKET EXTRACTING SECTION
S12
REGISTER PID OF PAT AND PID OF EIT IN SECOND NECESSARY PID TABLE (REGISTRATION OF P2 AND P7)
S13
EXTRACT TS PACKET INCLUDING PIDS (PIDS OF PAT AND EIT) REGISTERED IN SECOND NECESSARY PID TABLE FROM SECOND TS, AND OUTPUT IT AS NECESSARY PACKET NecesP TO IDENTICAL-PACKET-IDENTIFIER DETERMINING SECTION AND PACKET-IDENTIFIER CONVERTING SECTION
A

FIG. 11

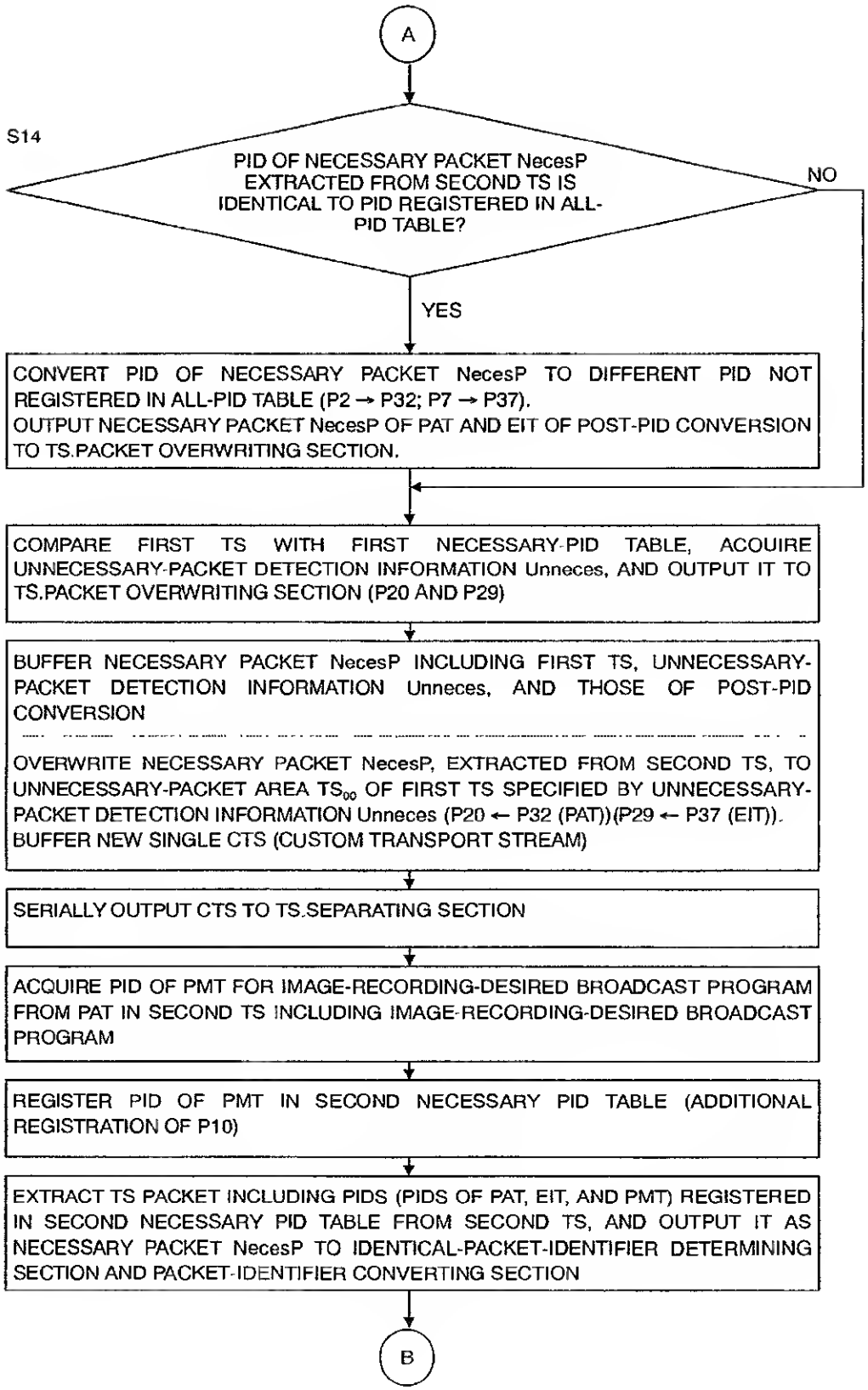

A
S14
PID OF NECESSARY PACKET NecesP EXTRACTED FROM SECOND TS IS IDENTICAL TO PID REGISTERED IN ALL-PID TABLE?
NO
YES
S15
CONVERT PID OF NECESSARY PACKET NecesP TO DIFFERENT PID NOT REGISTERED IN ALL-PID TABLE (P2 → P32; P7 → P37).
OUTPUT NECESSARY PACKET NecesP OF PAT AND EIT OF POST-PID CONVERSION TO TS.PACKET OVERWRITING SECTION.
S16
COMPARE FIRST TS WITH FIRST NECESSARY-PID TABLE, ACOUIRE UNNECESSARY-PACKET DETECTION INFORMATION Unneces, AND OUTPUT IT TO TS.PACKET OVERWRITING SECTION (P20 AND P29)
S17
BUFFER NECESSARY PACKET NecesP INCLUDING FIRST TS, UNNECESSARY-PACKET DETECTION INFORMATION Unneces, AND THOSE OF POST-PID CONVERSION
OVERWRITE NECESSARY PACKET NecesP, EXTRACTED FROM SECOND TS, TO UNNECESSARY-PACKET AREA TS00 OF FIRST TS SPECIFIED BY UNNECESSARY-PACKET DETECTION INFORMATION Unneces (P20 ← P32 (PAT))(P29 ← P37 (EIT)).
BUFFER NEW SINGLE CTS (CUSTOM TRANSPORT STREAM)
S18
SERIALLY OUTPUT CTS TO TS.SEPARATING SECTION
S19
ACQUIRE PID OF PMT FOR IMAGE-RECORDING-DESIRED BROADCAST PROGRAM FROM PAT IN SECOND TS INCLUDING IMAGE-RECORDING-DESIRED BROADCAST PROGRAM
S20
REGISTER PID OF PMT IN SECOND NECESSARY PID TABLE (ADDITIONAL REGISTRATION OF P10)
S21
EXTRACT TS PACKET INCLUDING PIDS (PIDS OF PAT, EIT, AND PMT) REGISTERED IN SECOND NECESSARY PID TABLE FROM SECOND TS, AND OUTPUT IT AS NECESSARY PACKET NecesP TO IDENTICAL-PACKET-IDENTIFIER DETERMINING SECTION AND PACKET-IDENTIFIER CONVERTING SECTION
B

FIG. 12

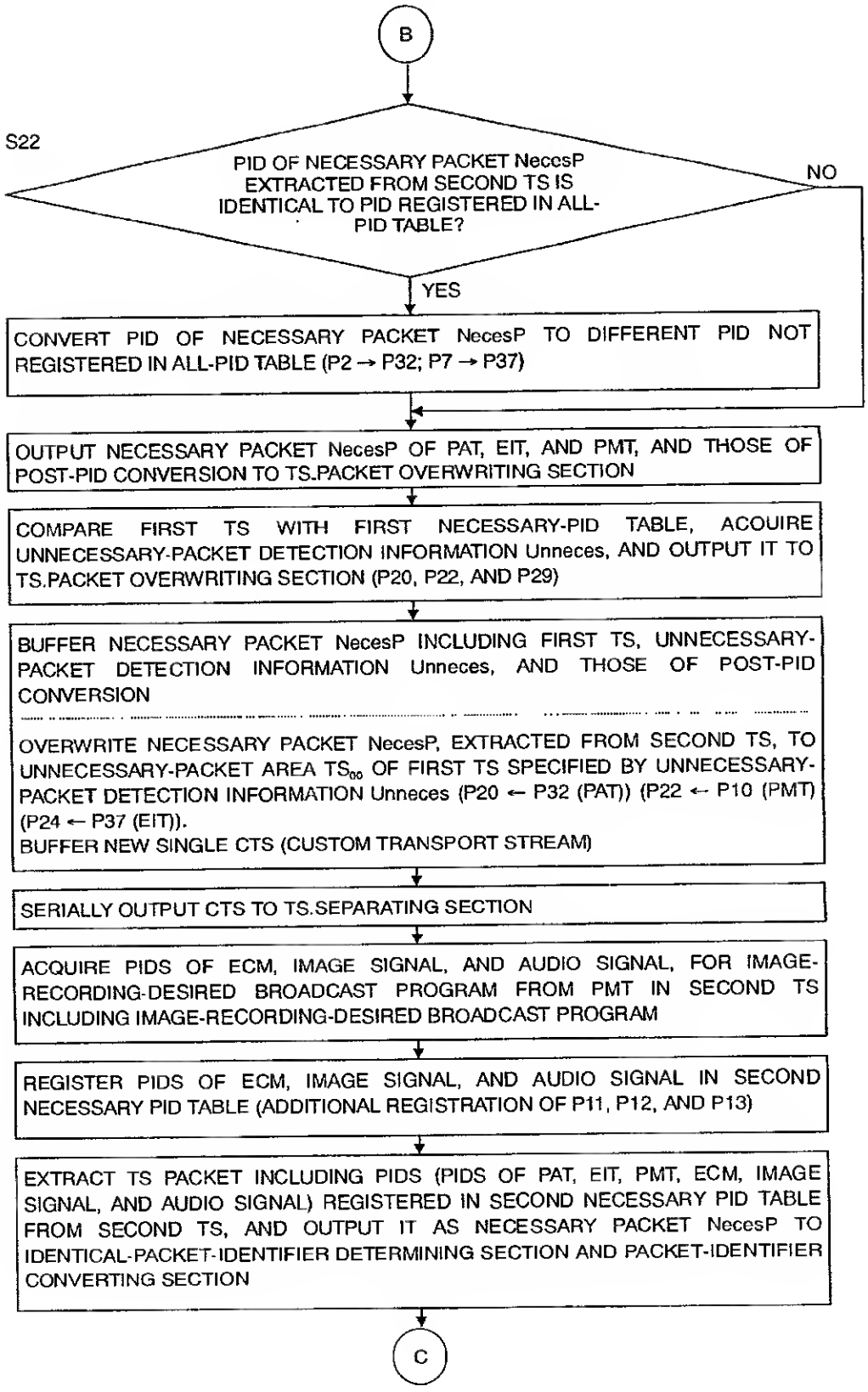
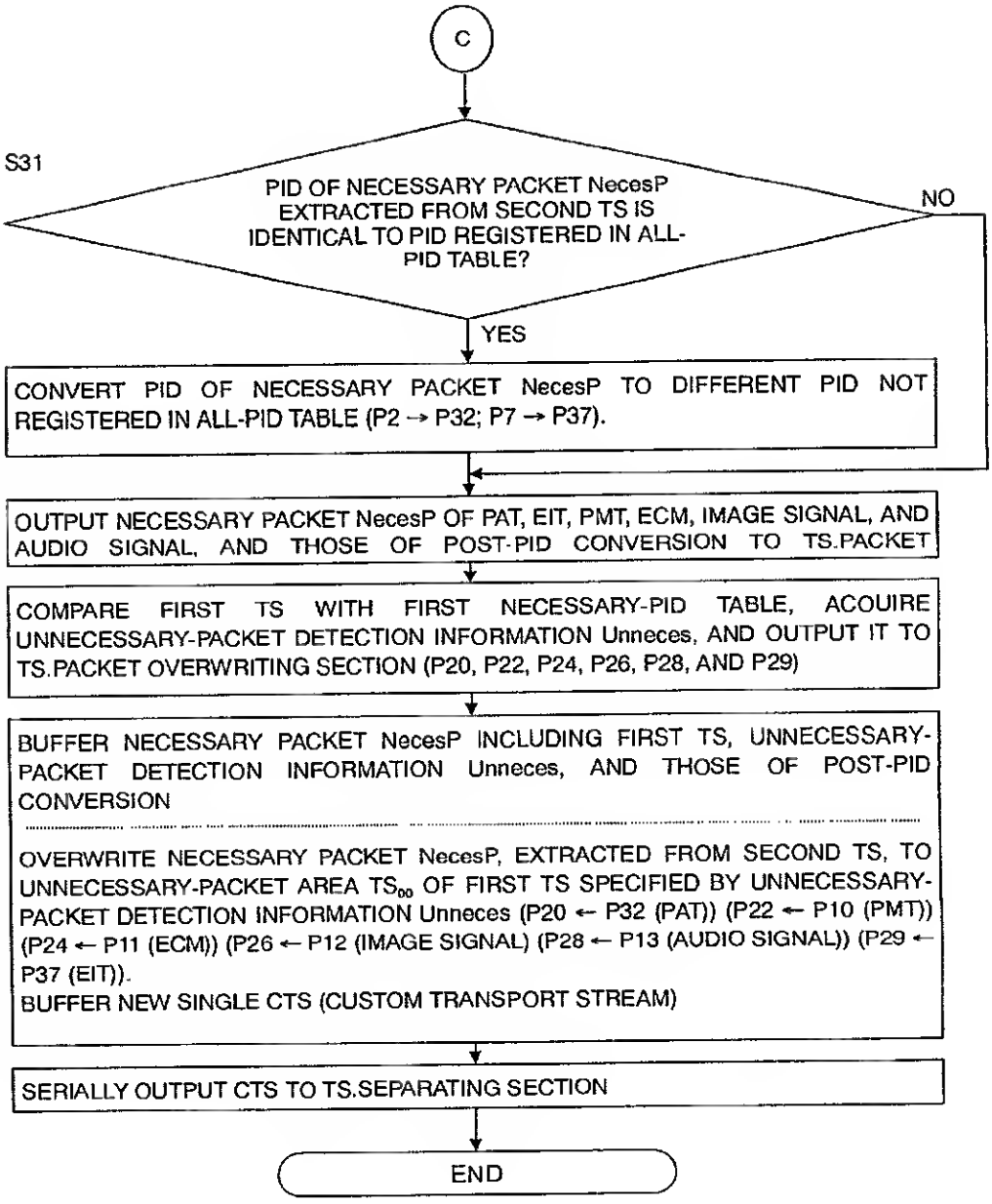
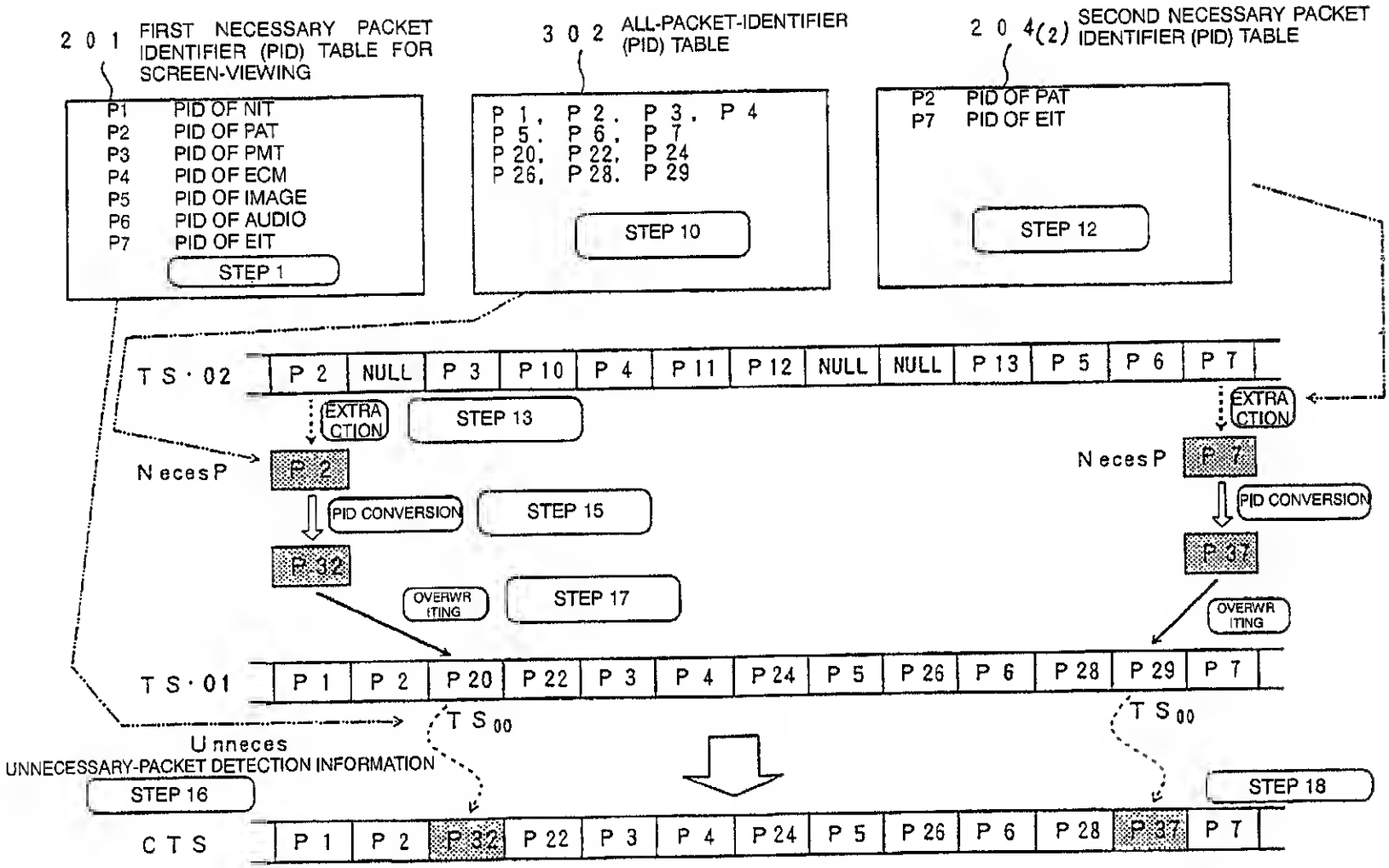

B
S22
PID OF NECESSARY PACKET NecesP EXTRACTED FROM SECOND TS IS IDENTICAL TO PID REGISTERED IN ALL-PID TABLE?
NO
YES
S23
CONVERT PID OF NECESSARY PACKET NecesP TO DIFFERENT PID NOT REGISTERED IN ALL-PID TABLE (P2 → P32; P7 → P37)
S24
OUTPUT NECESSARY PACKET NecesP OF PAT, EIT, AND PMT, AND THOSE OF POST-PID CONVERSION TO TS.PACKET OVERWRITING SECTION
S25
COMPARE FIRST TS WITH FIRST NECESSARY-PID TABLE, ACQUIRE UNNECESSARY-PACKET DETECTION INFORMATION Unneces, AND OUTPUT IT TO TS.PACKET OVERWRITING SECTION (P20, P22, AND P29)
S26
BUFFER NECESSARY PACKET NecesP INCLUDING FIRST TS, UNNECESSARY-PACKET DETECTION INFORMATION Unneces, AND THOSE OF POST-PID CONVERSION
OVERWRITE NECESSARY PACKET NecesP, EXTRACTED FROM SECOND TS, TO UNNECESSARY-PACKET AREA TS00 OF FIRST TS SPECIFIED BY UNNECESSARY-PACKET DETECTION INFORMATION Unneces (P20 ← P32 (PAT)) (P22 ← P10 (PMT)) (P24 ← P37 (EIT)).
BUFFER NEW SINGLE CTS (CUSTOM TRANSPORT STREAM)
S27
SERIALLY OUTPUT CTS TO TS.SEPARATING SECTION
S28
ACQUIRE PIDS OF ECM, IMAGE SIGNAL, AND AUDIO SIGNAL, FOR IMAGE-RECORDING-DESIRED BROADCAST PROGRAM FROM PMT IN SECOND TS INCLUDING IMAGE-RECORDING-DESIRED BROADCAST PROGRAM
S29
REGISTER PIDS OF ECM, IMAGE SIGNAL, AND AUDIO SIGNAL IN SECOND NECESSARY PID TABLE (ADDITIONAL REGISTRATION OF P11, P12, AND P13)
S30
EXTRACT TS PACKET INCLUDING PIDS (PIDS OF PAT, EIT, PMT, ECM, IMAGE SIGNAL, AND AUDIO SIGNAL) REGISTERED IN SECOND NECESSARY PID TABLE FROM SECOND TS, AND OUTPUT IT AS NECESSARY PACKET NecesP TO IDENTICAL-PACKET-IDENTIFIER DETERMINING SECTION AND PACKET-IDENTIFIER CONVERTING SECTION
C

FIG. 13


C
S31
PID OF NECESSARY PACKET NecesP EXTRACTED FROM SECOND TS IS IDENTICAL TO PID REGISTERED IN ALL-PID TABLE?
NO
YES
S32
CONVERT PID OF NECESSARY PACKET NecesP TO DIFFERENT PID NOT REGISTERED IN ALL-PID TABLE (P2 → P32; P7 → P37).
S33
OUTPUT NECESSARY PACKET NecesP OF PAT, EIT, PMT, ECM, IMAGE SIGNAL, AND AUDIO SIGNAL, AND THOSE OF POST-PID CONVERSION TO TS.PACKET
S34
COMPARE FIRST TS WITH FIRST NECESSARY-PID TABLE, ACOUIRE UNNECESSARY-PACKET DETECTION INFORMATION Unneces, AND OUTPUT IT TO TS.PACKET OVERWRITING SECTION (P20, P22, P24, P26, P28, AND P29)
S35
BUFFER NECESSARY PACKET NecesP INCLUDING FIRST TS, UNNECESSARY-PACKET DETECTION INFORMATION Unneces, AND THOSE OF POST-PID CONVERSION
OVERWRITE NECESSARY PACKET NecesP, EXTRACTED FROM SECOND TS, TO UNNECESSARY-PACKET AREA TS∞ OF FIRST TS SPECIFIED BY UNNECESSARY-PACKET DETECTION INFORMATION Unneces (P20 ← P32 (PAT)) (P22 ← P10 (PMT)) (P24 ← P11 (ECM)) (P26 ← P12 (IMAGE SIGNAL) (P28 ← P13 (AUDIO SIGNAL)) (P29 ← P37 (EIT)).
BUFFER NEW SINGLE CTS (CUSTOM TRANSPORT STREAM)
S36
SERIALLY OUTPUT CTS TO TS.SEPARATING SECTION
END

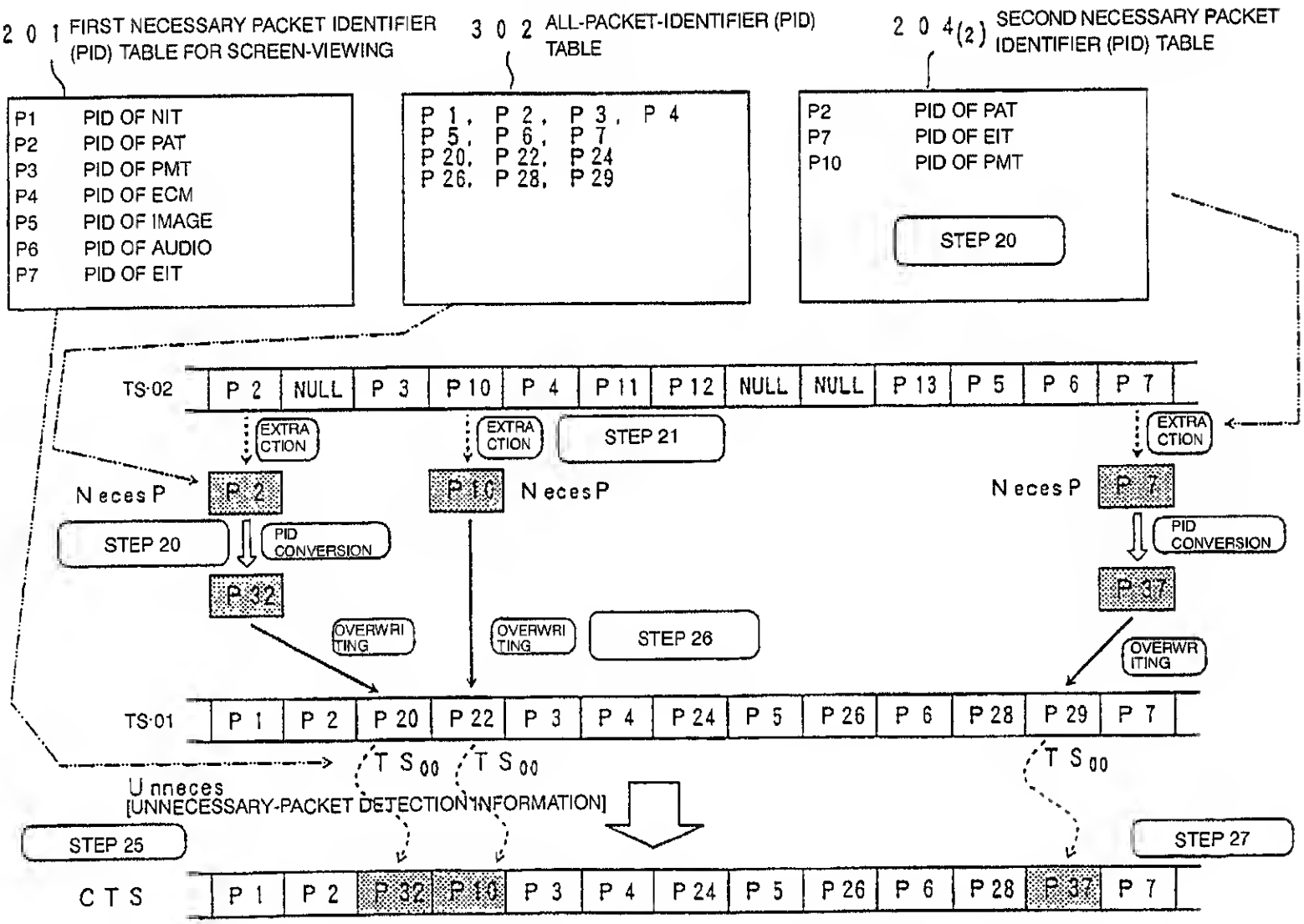
PATENT OFFICE

FIG. 14



ADOBE DOCUMENT

FIG. 15



PCT/JP2004/013260

FIG. 16

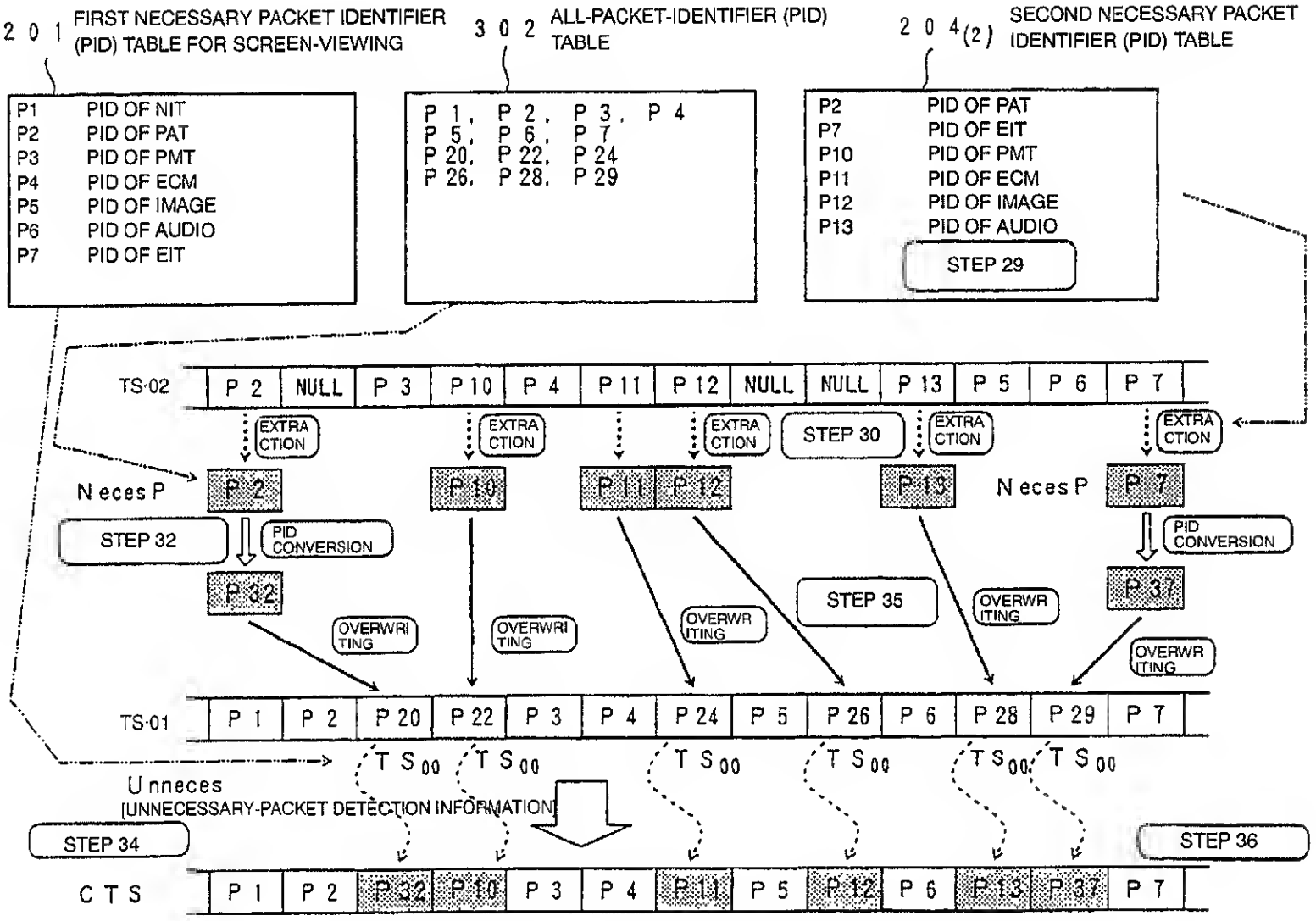
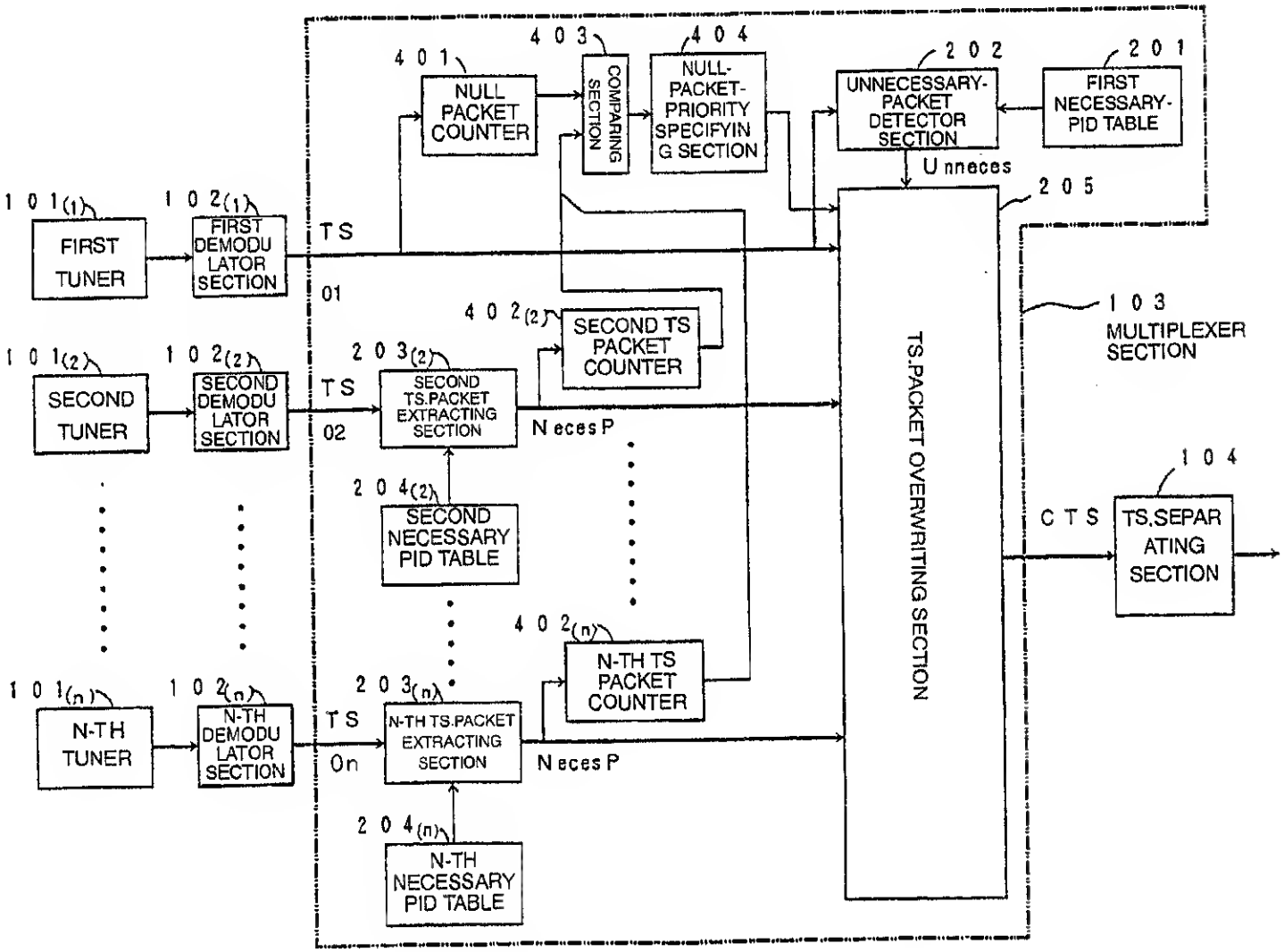


FIG. 17


101(1)
FIRST TUNER
102(1)
FIRST DEMODULATOR SECTION
TS 01
101(2)
SECOND TUNER
102(2)
SECOND DEMODULATOR SECTION
TS 02
101(n)
N-TH TUNER
102(n)
N-TH DEMODULATOR SECTION
TS On
401
NULL PACKET COUNTER
403
COMPARING SECTION
404
NULL-PACKET-PRIORITY SPECIFYING SECTION
402(2)
SECOND TS PACKET COUNTER
203(2)
SECOND TS.PACKET EXTRACTING SECTION
Neces P
204(2)
SECOND NECESSARY PID TABLE
402(n)
N-TH TS PACKET COUNTER
203(n)
N-TH TS.PACKET EXTRACTING SECTION
Neces P
204(n)
N-TH NECESSARY PID TABLE
202
UNNECESSARY-PACKET DETECTOR SECTION
201
FIRST NECESSARY-PID TABLE
Unneces
205
TS.PACKET OVERWRITING SECTION
103
MULTIPLEXER SECTION
104
CTS
TS.SEPARATING SECTION

FUETED BEEMSZED

FIG. 18A

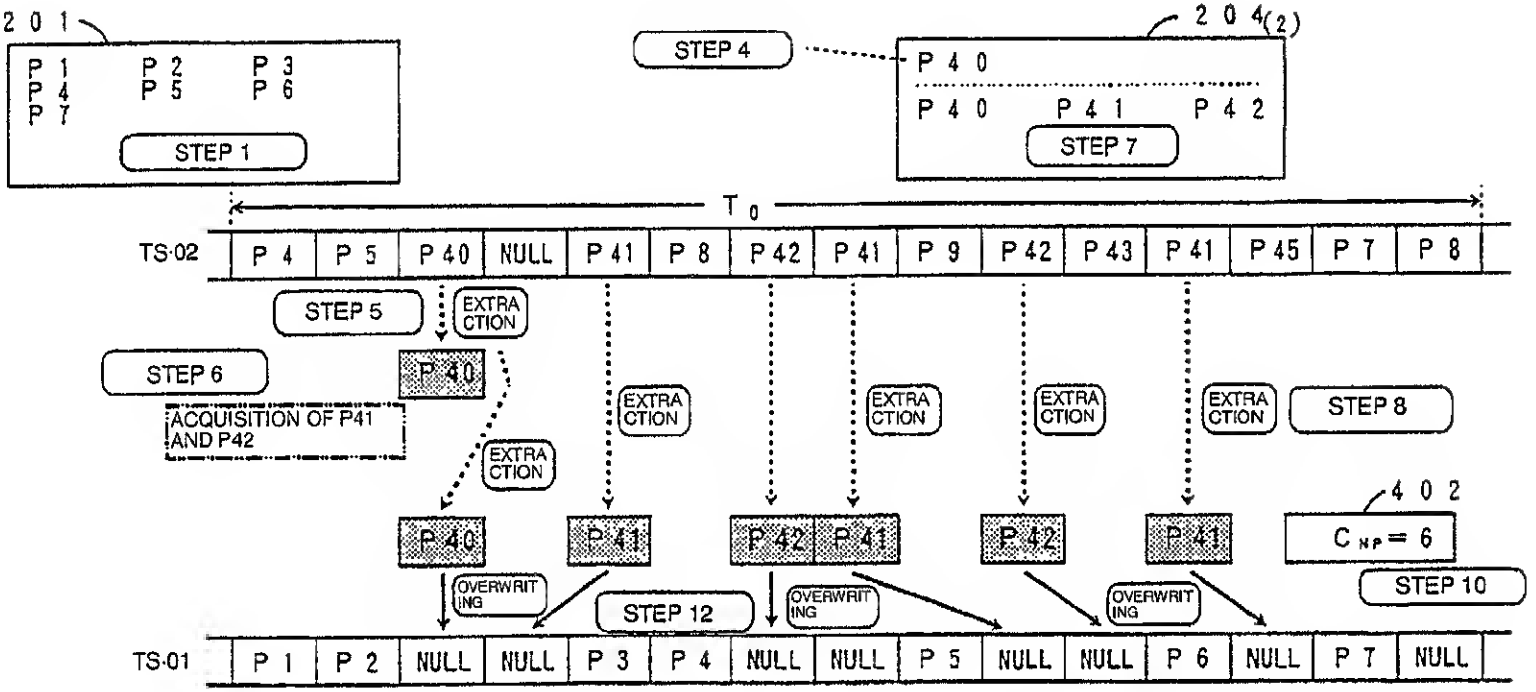


FIG.18B

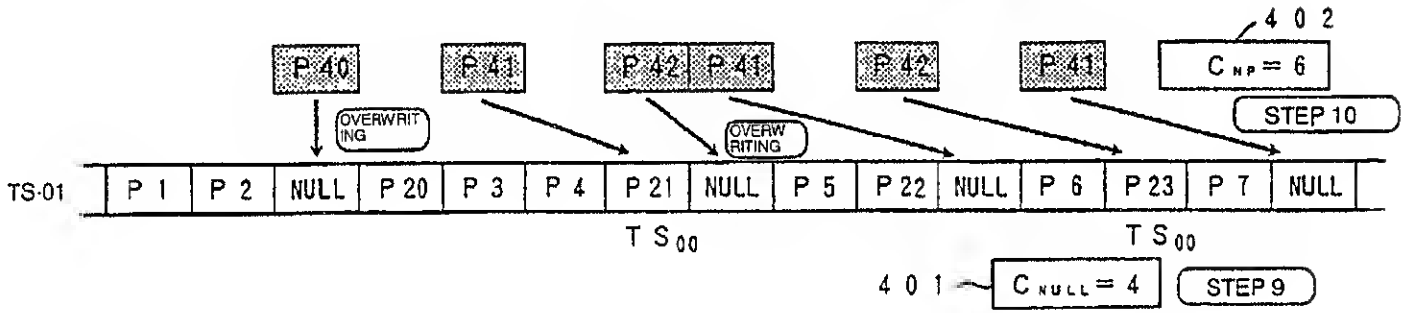


FIG. 19A

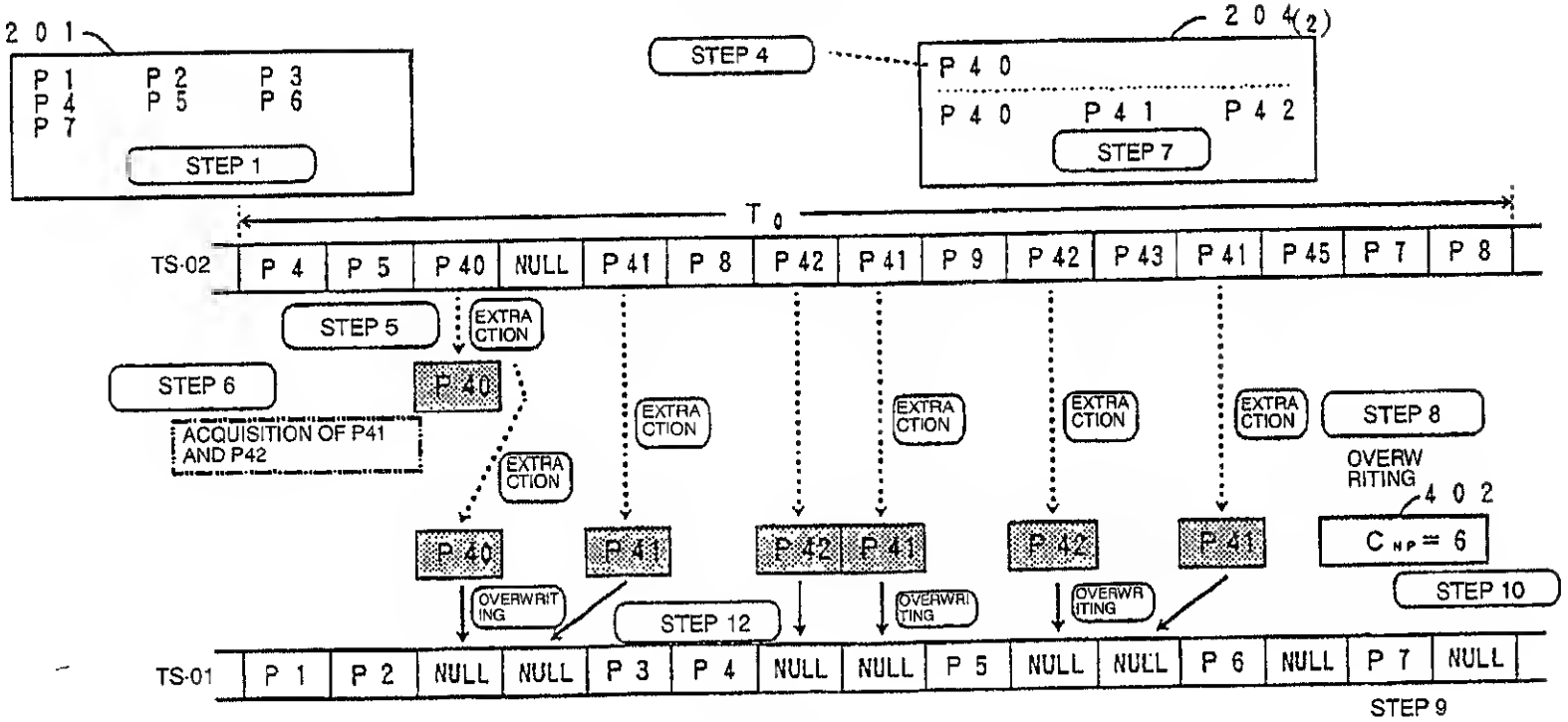


FIG.19B

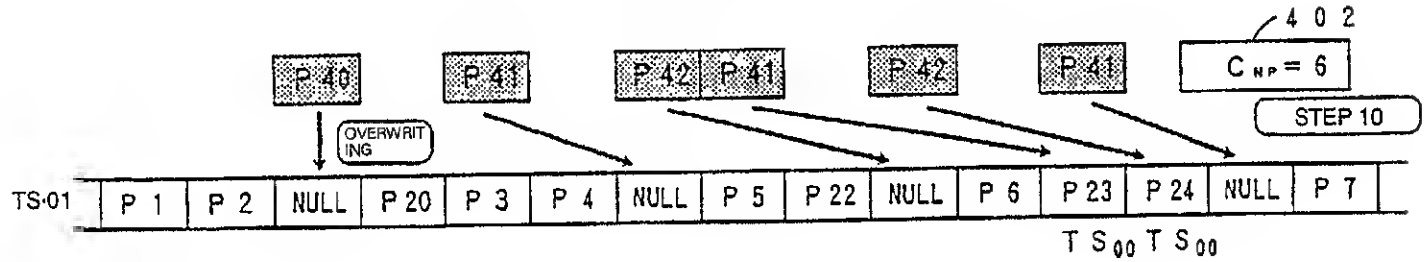
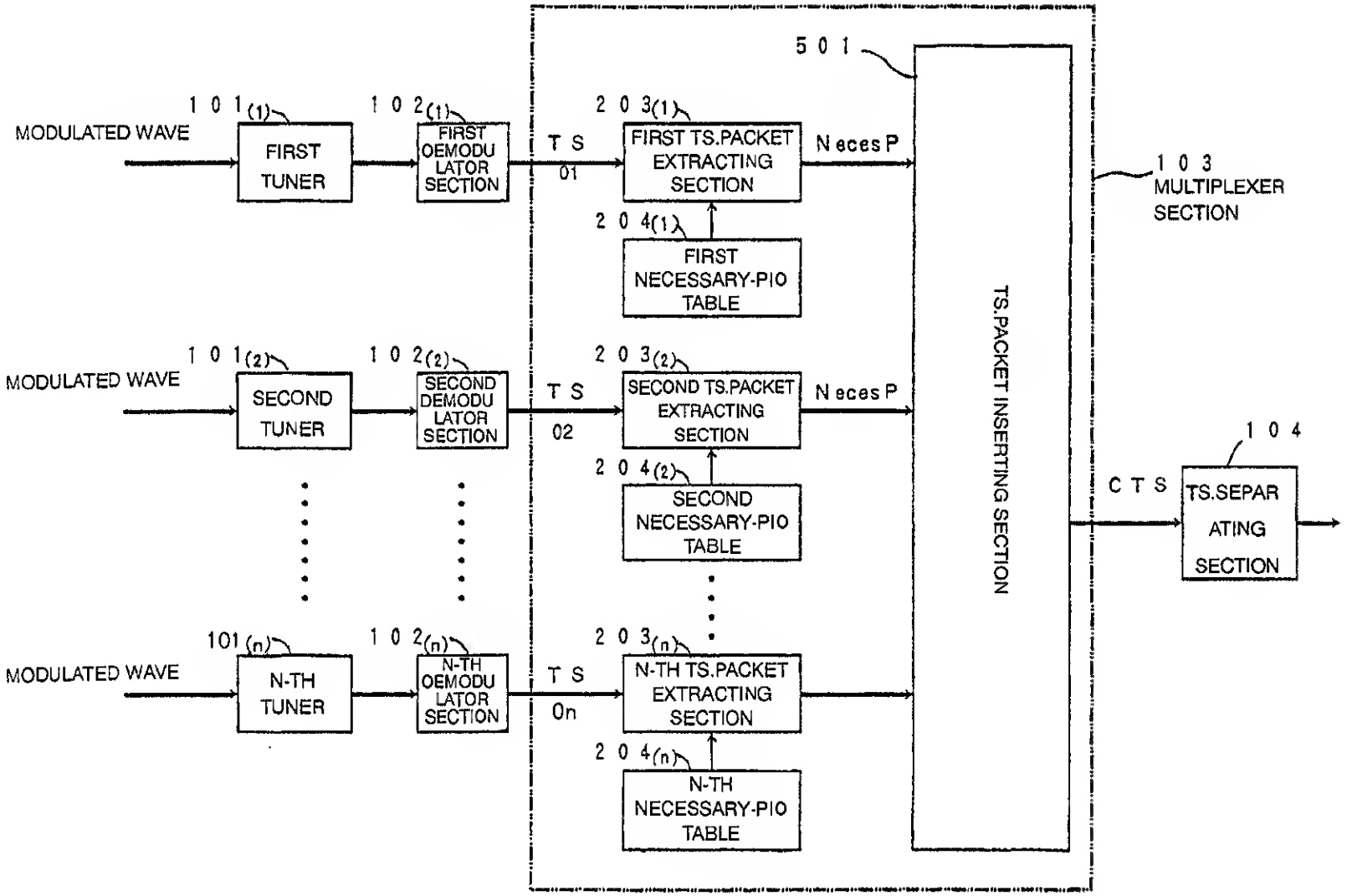
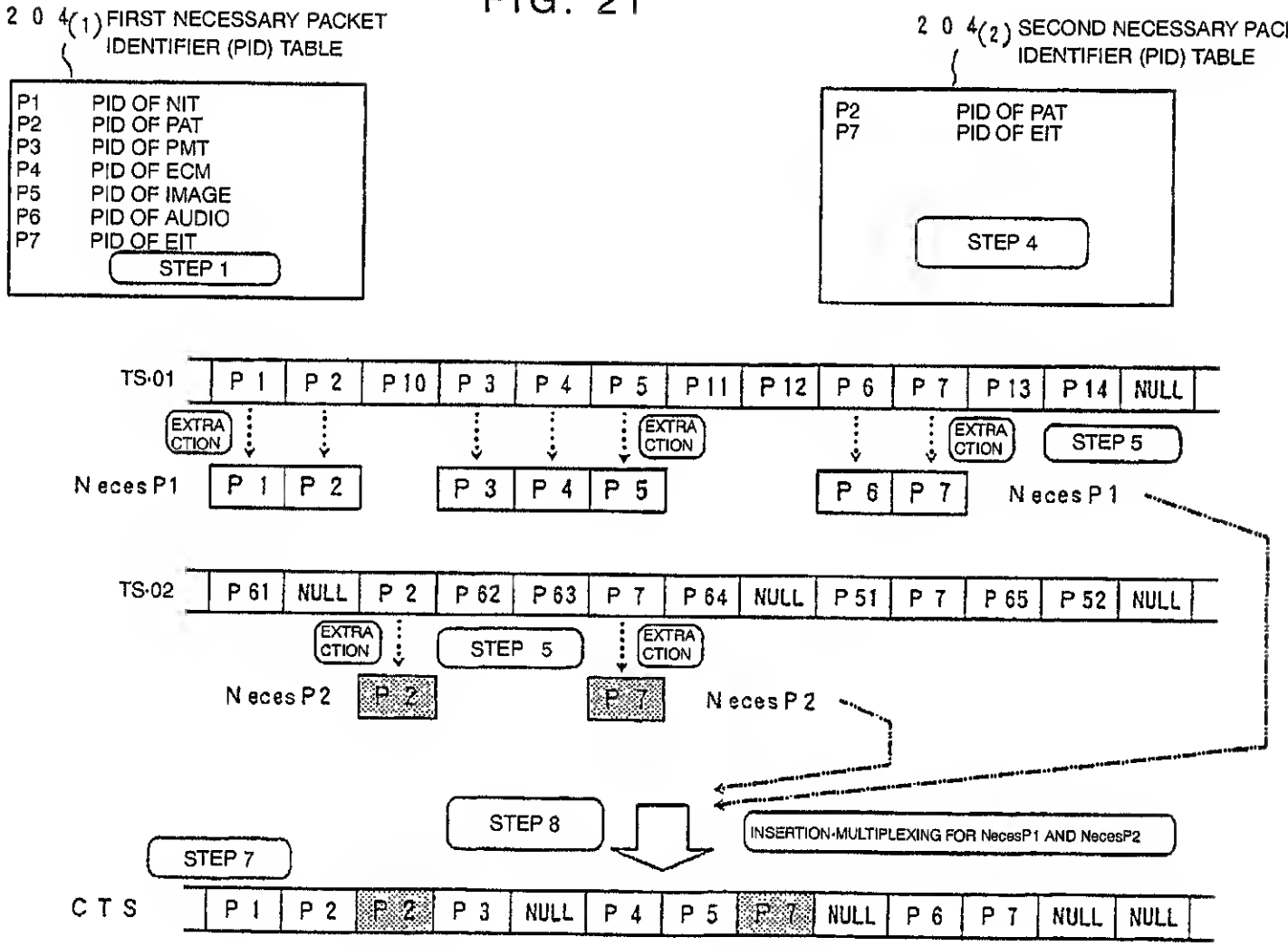


FIG. 20


MODULATED WAVE
101(1)
FIRST TUNER
102(1)
FIRST OEMODULATOR SECTION
TS 01
203(1)
FIRST TS.PACKET EXTRACTING SECTION
NeceS P
204(1)
FIRST NECESSARY-PIO TABLE
MODULATED WAVE
101(2)
SECOND TUNER
102(2)
SECOND DEMODULATOR SECTION
TS 02
203(2)
SECOND TS.PACKET EXTRACTING SECTION
NeceS P
204(2)
SECOND NECESSARY-PIO TABLE
MODULATED WAVE
101(n)
N-TH TUNER
102(n)
N-TH OEMODULATOR SECTION
TS On
203(n)
N-TH TS.PACKET EXTRACTING SECTION
204(n)
N-TH NECESSARY-PIO TABLE
501
TS.PACKET INSERTING SECTION
103
MULTIPLEXER SECTION
CTS
104
TS.SEPARATING SECTION

EUROPEAN PATENT APPLICATION

FIG. 21



PUBLISHED SEARCHED

FIG. 22

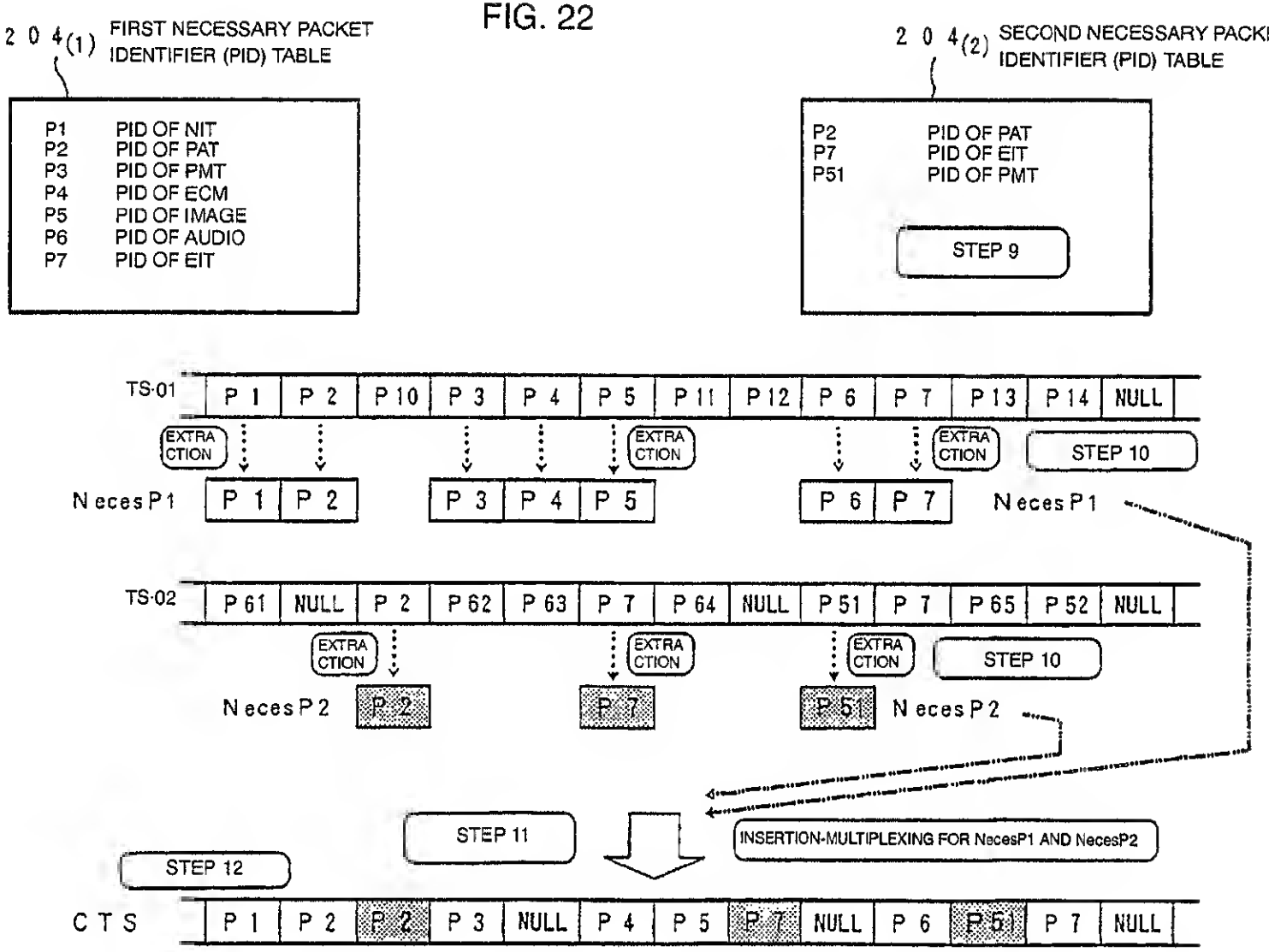


FIG. 23

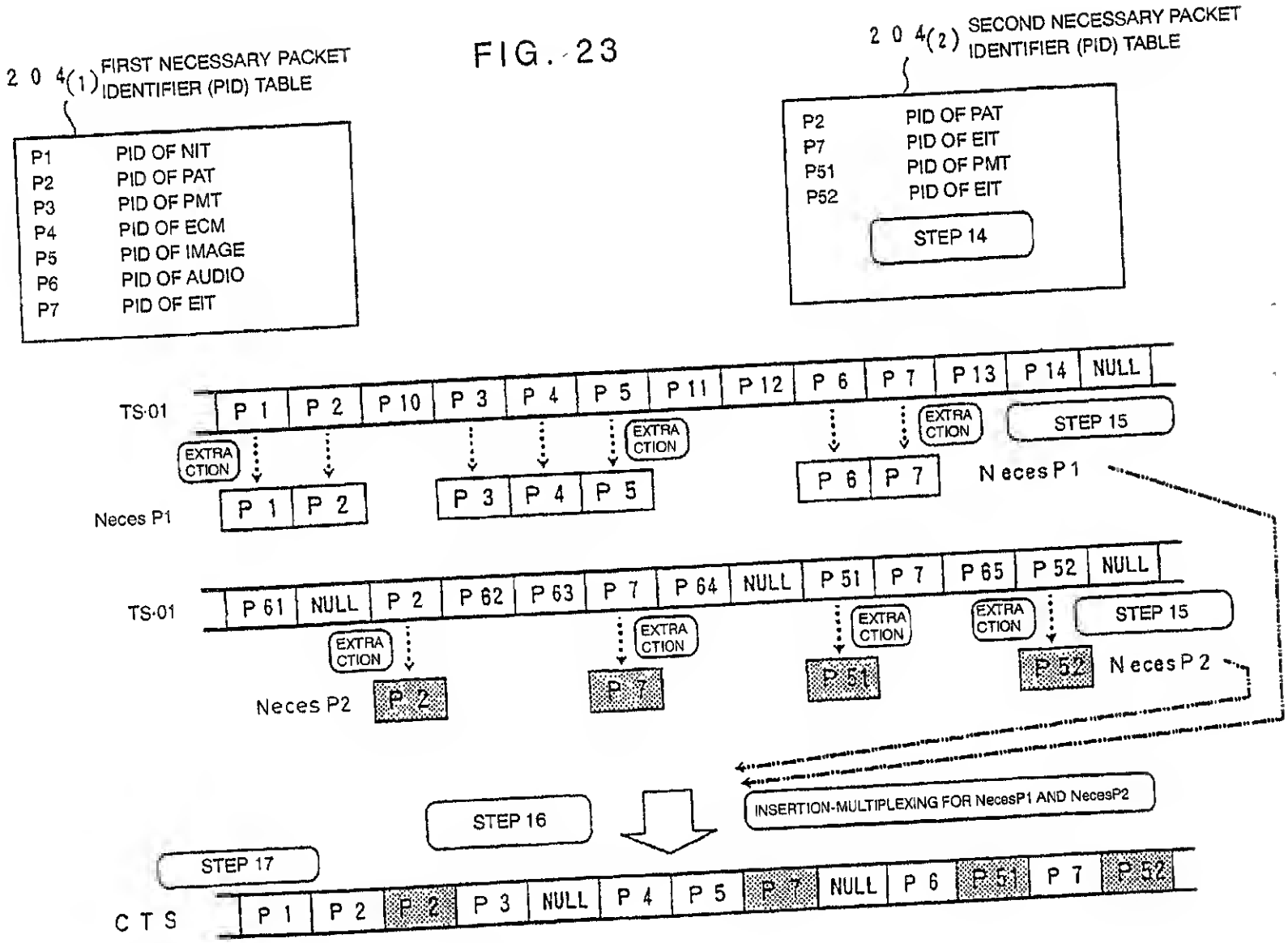

204(1) FIRST NECESSARY PACKET IDENTIFIER (PID) TABLE
P1 PID OF NIT
P2 PID OF PAT
P3 PID OF PMT
P4 PID OF ECM
P5 PID OF IMAGE
P6 PID OF AUDIO
P7 PID OF EIT
204(2) SECOND NECESSARY PACKET IDENTIFIER (PID) TABLE
P2 PID OF PAT
P7 PID OF EIT
P51 PID OF PMT
P52 PID OF EIT
STEP 14
TS-01
P 1 P 2 P 10 P 3 P 4 P 5 P 11 P 12 P 6 P 7 P 13 P 14 NULL
EXTRACTION
STEP 15
Neces P1
P 1 P 2
P 3 P 4 P 5
P 6 P 7
Neces P1
TS-01
P 61 NULL P 2 P 62 P 63 P 7 P 64 NULL P 51 P 7 P 65 P 52 NULL
EXTRACTION
STEP 15
Neces P2
P 2
P 7
P 51
P 52
Neces P2
STEP 16
INSERTION-MULTIPLEXING FOR NecesP1 AND NecesP2
STEP 17
CTS
P 1 P 2 P 2 P 3 NULL P 4 P 5 P 7 NULL P 6 P 51 P 7 P 52

FIG. 24

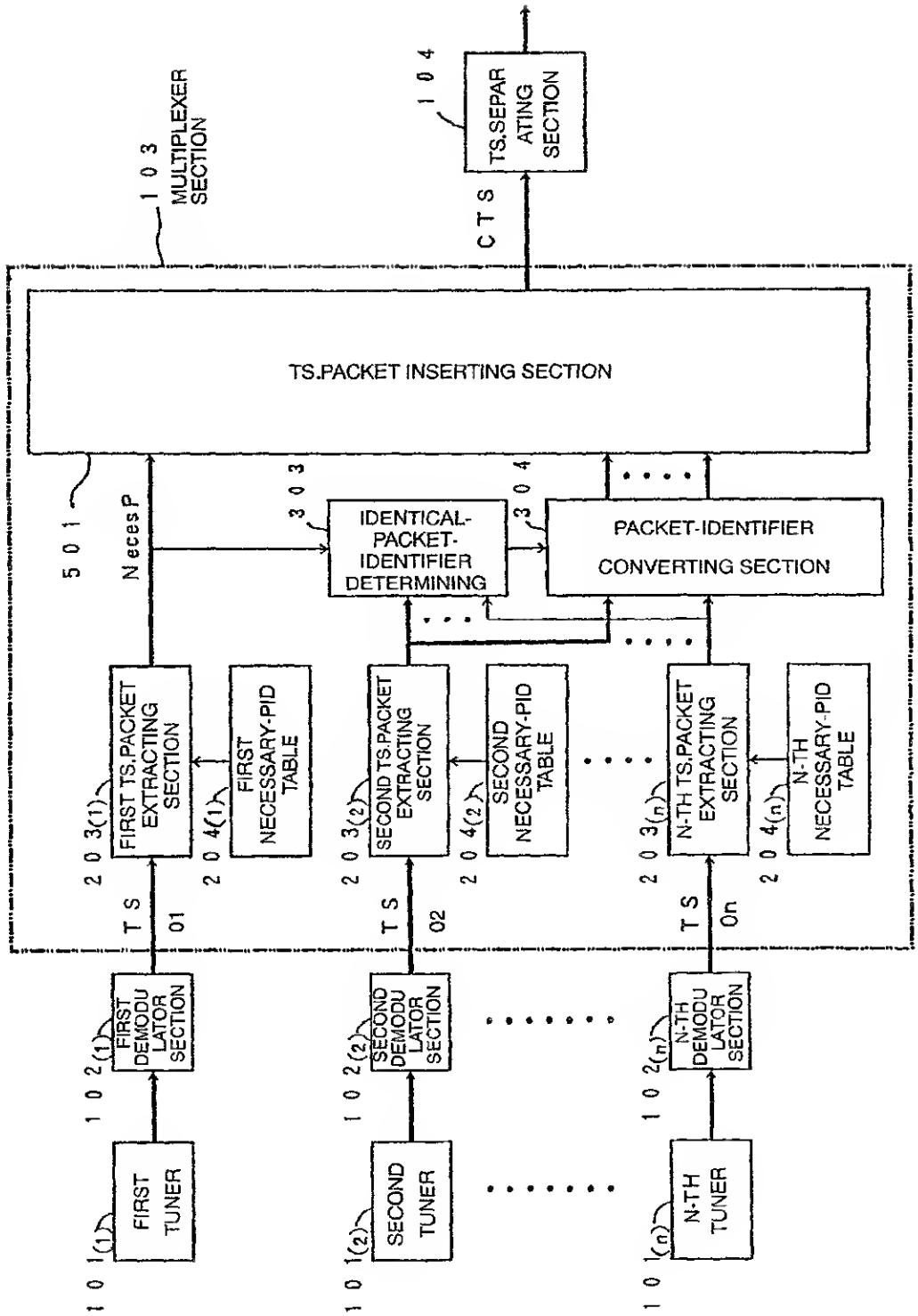

TS.PACKET INSERTING SECTION
MULTIPLEXER SECTION
103
TS.SEPARATING SECTION
104
CTS
501
Necessary
IDENTICAL-PACKET-IDENTIFIER DETERMINING
303
PACKET-IDENTIFIER CONVERTING SECTION
304
FIRST TS.PACKET EXTRACTING SECTION
203(1)
FIRST NECESSARY-PID TABLE
204(1)
SECOND TS.PACKET EXTRACTING SECTION
203(2)
SECOND NECESSARY-PID TABLE
204(2)
N-TH TS.PACKET EXTRACTING SECTION
203(n)
N-TH NECESSARY-PID TABLE
204(n)
TS
01
02
On
FIRST DEMODULATOR SECTION
102(1)
SECOND DEMODULATOR SECTION
102(2)
N-TH DEMODULATOR SECTION
102(n)
FIRST TUNER
101(1)
SECOND TUNER
101(2)
N-TH TUNER
101(n)

FIG. 25

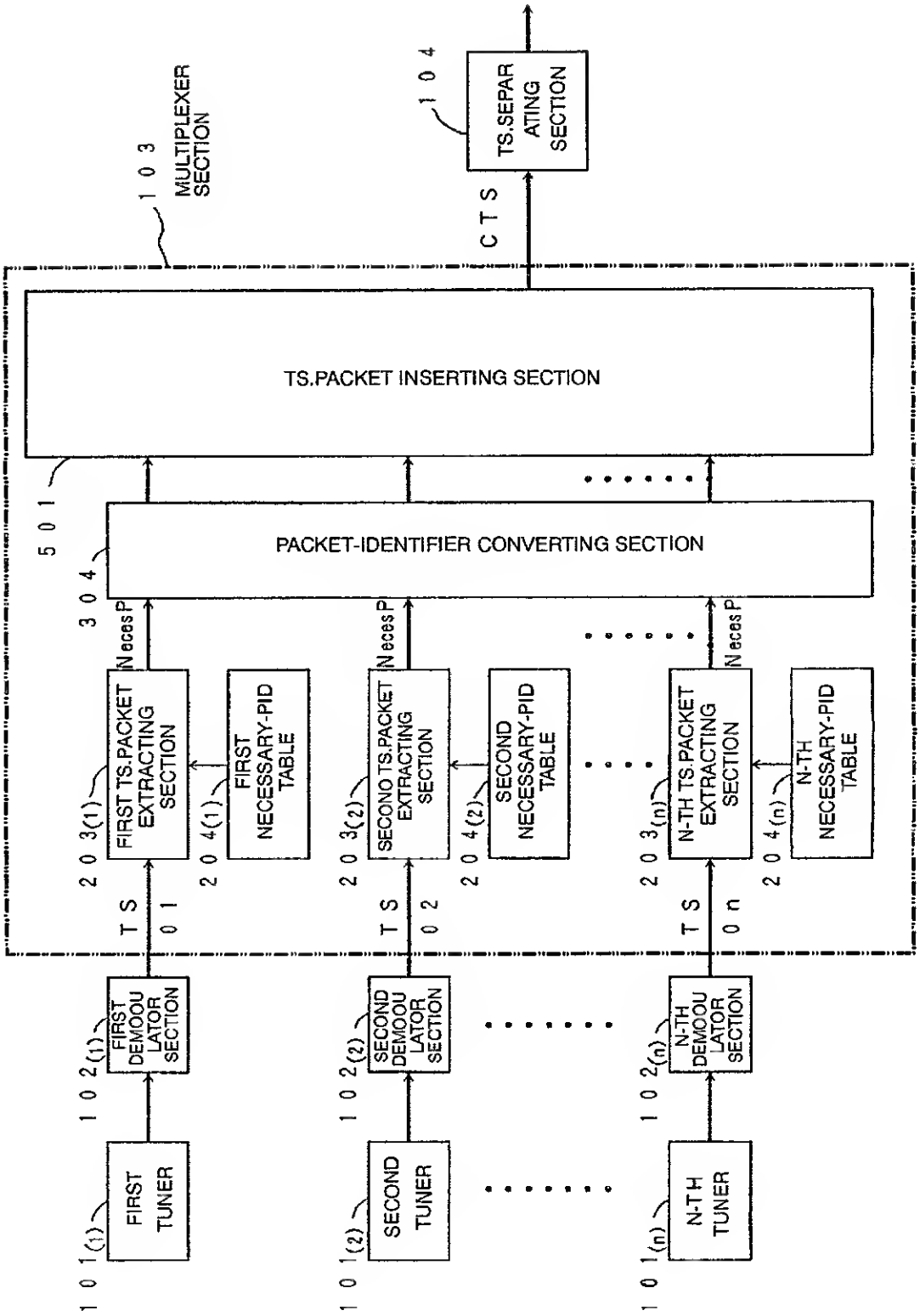

MULTIPLEXER SECTION
103
TS.SEPARATING SECTION
104
CTS
TS.PACKET INSERTING SECTION
501
PACKET-IDENTIFIER CONVERTING SECTION
304
FIRST TS.PACKET EXTRACTING SECTION
203(1)
FIRST NECESSARY-PID TABLE
204(1)
SECONO TS.PACKET EXTRACTING SECTION
203(2)
SECOND NECESSARY-PID TABLE
204(2)
N-TH TS.PACKET EXTRACTING SECTION
203(n)
N-TH NECESSARY-PID TABLE
204(n)
TS
FIRST DEMODULATOR SECTION
102(1)
SECOND DEMODULATOR SECTION
102(2)
N-TH DEMODULATOR SECTION
102(n)
FIRST TUNER
101(1)
SECOND TUNER
101(2)
N-TH TUNER
101(n)

FIG. 26

204(1) FIRST NECESSARY PACKET IDENTIFIER (PID) TABLE

P1	PID OF NIT
P2	PID OF PAT
P3	PID OF PMT
P4	PID OF ECM
P5	PID OF IMAGE
P6	PID OF AUDIO
P7	PID OF EIT

204(2) SECOND NECESSARY PACKET IDENTIFIER (PID) TABLE

P2	PID OF PAT
P7	PID OF EIT
P51	PID OF PMT
P52	PID OF EIT

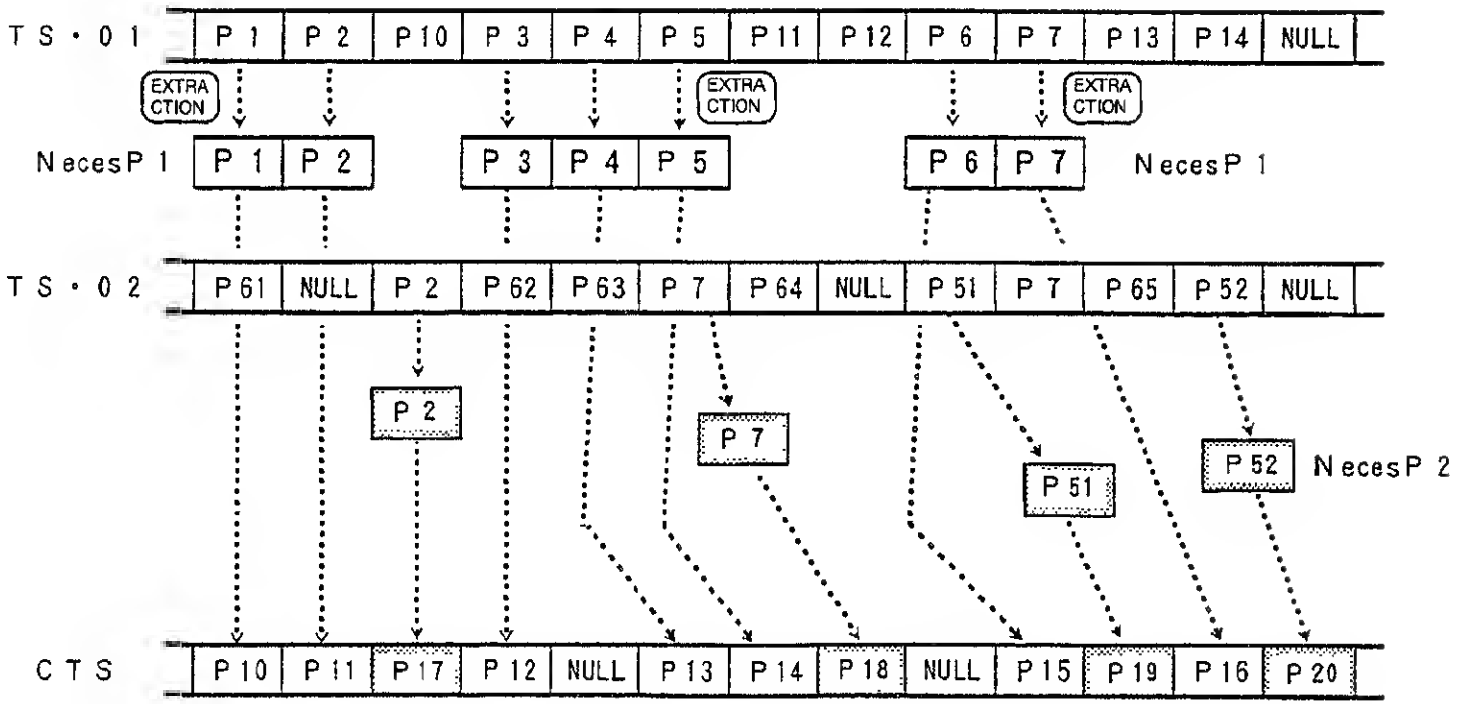


FIG. 27

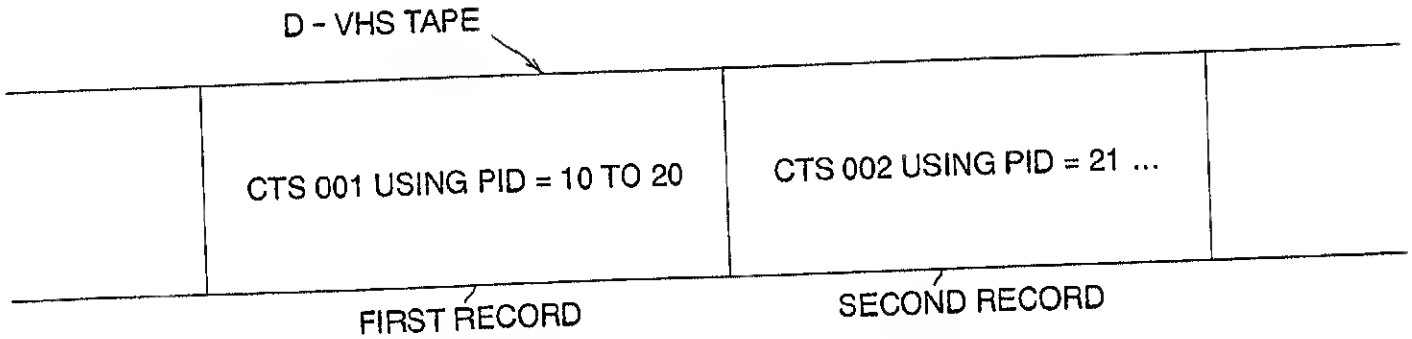
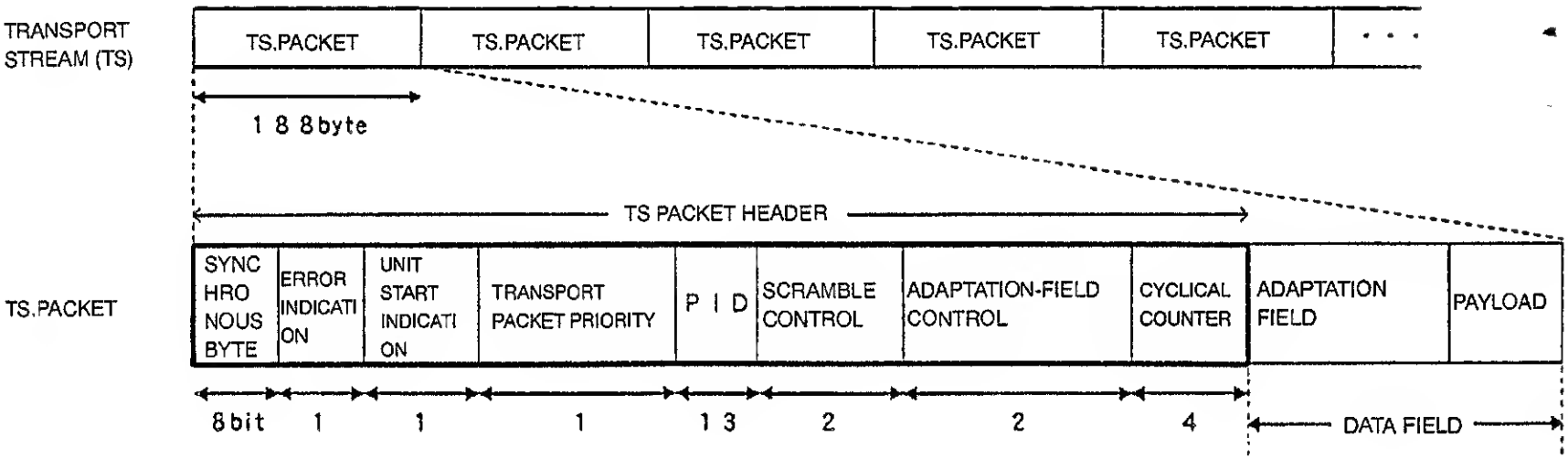

D - VHS TAPE
CTS 001 USING PID = 10 TO 20
CTS 002 USING PID = 21 ...
FIRST RECORD
SECOND RECORD

FIG. 28


TRANSPORT STREAM (TS)
TS.PACKET
TS.PACKET
TS.PACKET
TS.PACKET
TS.PACKET
1 8 8byte
TS PACKET HEADER
TS.PACKET
SYNC HRO NOUS BYTE
ERROR INDICATI ON
UNIT START INDICATI ON
TRANSPORT PACKET PRIORITY
P I D
SCRAMBLE CONTROL
ADAPTATION-FIELD CONTROL
CYCLICAL COUNTER
ADAPTATION FIELD
PAYLOAD
8bit
1
1
1
1 3
2
2
4
DATA FIELD